The Builder.

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ILLUSTRATIONS.

Jumièges: North Aisle of Nave ..... From a Photograph.

Mount Grace Priory: Original State and Additions ..... Mr. Ambrose Poynter, Architect.

1. West Elevation.
2. East Elevation.

Design for a Town Church ..... By Mr. W. J. Tapper, A.R.I.B.A.

Sketch for the Church of the Ascension, Plumstead ..... By C. H. M. Mileham.

Illustrations in Text.

The Church of Chipping Ongar:—

Fig. 1. Built-up Doorway, North Side of Nave ..... Page 144

Fig. 2. Early Blocked-up Window, North Side of Nave ..... Page 144

Fig. 3. South-east View ..... Page 145

The Church of Chipping Ongar (*contd.*):—

Fig. 4. North west View ..... Page 145

Manor House, Mount Grace Priory:—

Additions. Plan ..... Page 157

Detail of Entrance Doorway ..... Page 157

CONTENTS.

	PAGE
The Church of Chipping Ongar	143
Notes	146
Exhibition of Students' Work at South Kensington	147
Letter from Paris	148
The Royal Archæological Institute at Bristol	149
The Sanitary Institute Congress	150
The Architectural Association	156
Illustrations:—	
Jumièges	156
Manor House, Mount Grace Priory	156
Design for a Town Church	157
Design for Church of the Ascension, Plumstead	157
By-laws under the Public Health (London) Act, 1891	158
The Association of Municipal and County Engineers	158
National Federation of Building Trades Employers	159
Architectural Societies	159
Engineering Societies	159
Competitions	159
Books Received	160
Correspondence:—	
A Twofold Improvement	160
Wandsworth Baths Competition	160
The Student's Column	160
King's College, London	161
Westminster City Council	161
Court of Common Council	161
Obituary	161
General Building News	161
Appointments	162
Sanitary and Engineering News	162
Miscellaneous	162
Legal:—	
Claims for Remuneration	163
Civil Engineer's Action for Fees	163
The Acton Ancient Light Dispute	163
Swindon Ancient Light Dispute	164
Accident through a Defective Balcony	164
Patents	165
Some Recent Sales	166
Meetings	167
Prices Current	167
Tenders	168

The Church of Chipping Ongar.

TWENTY-THREE miles due north of London, on the little river Roding, is the old town of Chipping Ongar, thus called because of its ancient "chepe," or market, which probably served for the Hundred that took its name from this place. This old Anglo-Saxon settlement chiefly consists of a long street with more than one picturesque bend in it. Although it has lost in the last fifty or sixty years several of its old houses and cottages, and not a few of its trees, Chipping Ongar can still lay claim to a beauty and interest of its own, though not of so high an order as might be expected from the writings of Isaac Taylor (the literary Congregationalist minister of this town at the beginning of last century) and his two literary daughters.

Essex possesses several simple moated mounds, as well as mounds with base courts, the origin of which have been again debated with energy in the last few years. Of the latter of these two classes Ongar is a most striking example. The height and bulk of the great mound of Ongar Castle, the depth and width of its moat, and the solid rampart round the inner bailey unite in proving that there was here at one time a fortress of sufficient importance to dominate the immediate district. Part of the rampart and fosse of a second or outer bailey sweeps round for about 400 ft. on the west, to embrace, as it were, the town or settlement, though the rest of this has for the most part disappeared. There are also some traces of another, and probably later, court on the east. It is necessary to be fairly explicit as to these earthworks, for the date of the oldest part of the fabric of the present church hinges to some extent on this question. Those interested in this matter should consult the plan and description by Mr. T. Chalkley Gould in his excellent paper on the ancient earthworks of the county in the first volume of the "Victoria County History of Essex" (1903). A small piece of solidly-built rubble and tile masonry has been found in the rampart of the inner bailey, at a place where it is supposed that there was a communication with the outer bailey. The idea that masonry of a like character ran round the bailey rampart has been disproved, for excavations show that a chalky boulder-clay, gravel, and sand rammed together are the main constituents of the wall. There are also one or two other disjointed fragments of like rude masonry. On the whole, after careful examination, and after weighing analogous cases, the probable truth of the matter is that there was a mound here with an adjacent earthwork in pre-Norman days for an Anglo-Saxon defensive settlement of importance, which was held, just before the Conquest, by Ailida, a certain freewoman, as the centre of her broadlands. Such a view does not, however, clash with Mr. Round's belief that, when Count Eustace of Boulogne obtained his large grants from the Conqueror, he made Ongar the "caput" of his great Essex fief; for doubtless the old defensive works would then be put in repair. The moat was probably deepened, the keep mound of a castle raised, and a new or renewed outer bailey thrown out by Richard de Luci, Chief Justice of England, in 1162, when he made Ongar into a vast fortress. Ongar was bestowed on De Luci by William Earl of Mortaigne, son of King Stephen, and the lordship then became an honour. In 1176, after the rebellion of the barons, Henry II. took into his own keeping nearly all the English castles, including, as is expressly stated, that of his intimate friend Richard de Luci. The castle was demolished in Elizabeth's reign, and the fine dwelling-house erected in its place was in its turn removed in 1744.

As to the church, which stands under the shadow of the castle mound, history is almost silent. All that Morant's folio "History of Essex" (1768) has to say of Chipping Ongar in this connexion is contained in a paragraph of extreme brevity:—"The Church, dedicated to St. Martin, is of one pace with the Chancel, tyled. A spire, leaded, contains one Bell." It is further stated that the rectory has always been appendent to the manor, and that, the value of it being but small, the neighbouring church of Greensted was united to it, *temp.* Edward VI., by Act of Parliament, but that this Act was repealed in the next reign.

Records yield a single entry of interest relative to the early story of this fabric.

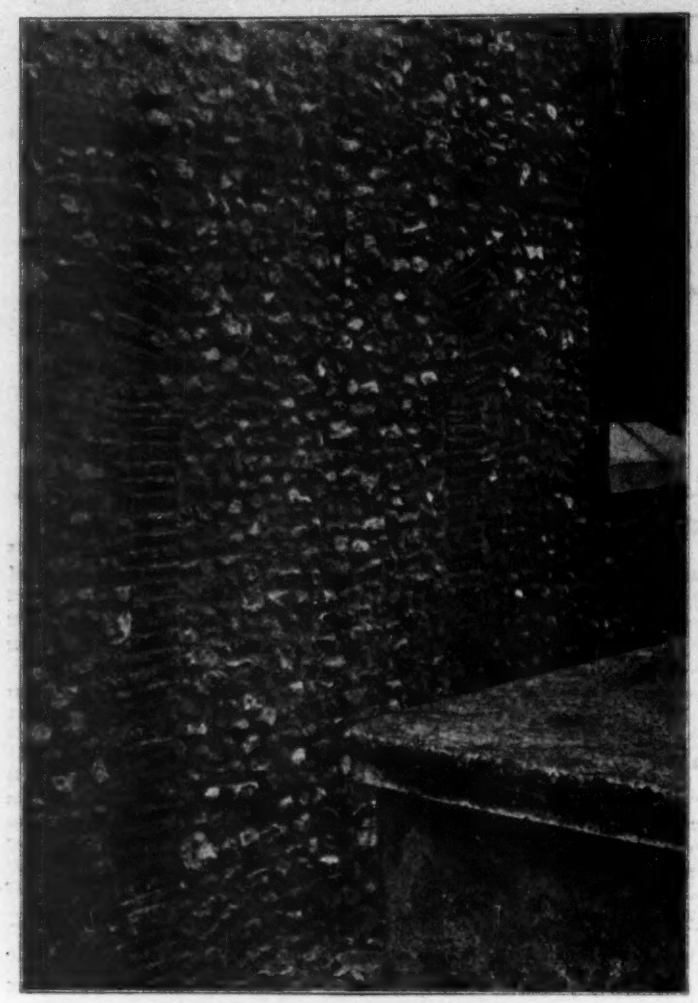

Fig. 1. Built-up Doorway, North Side of Nave.

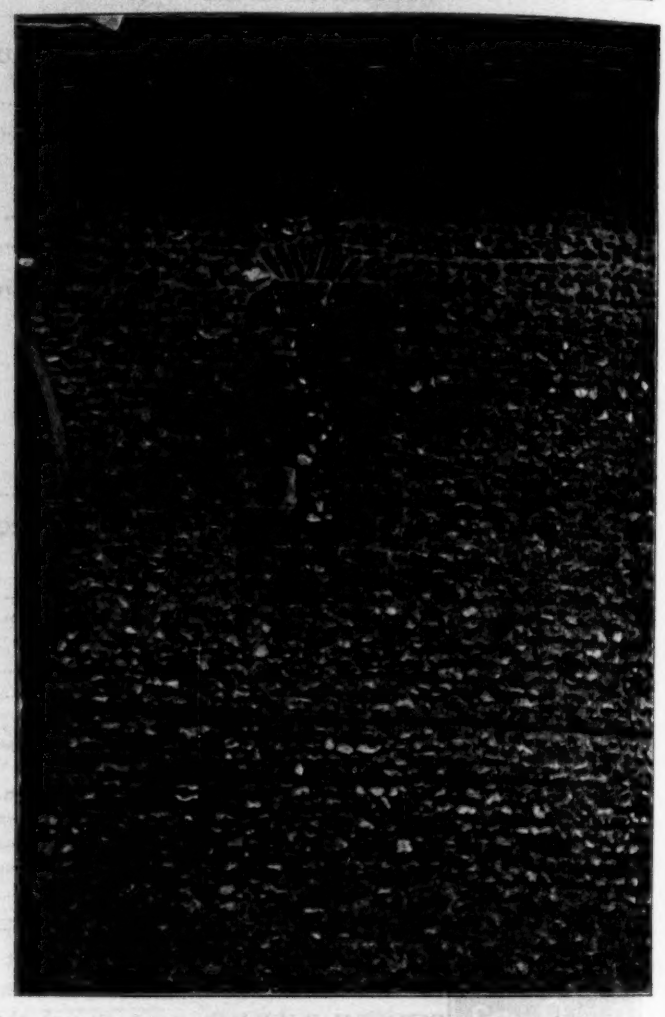

Fig. 2. Early Blocked up Window, North Side of Nave.

John, the clerk of Ongar, was ringing the church bell in 1285 when the clapper fell on him and killed him instantly. A verdict of death by misadventure was returned, and the value of the bell and clapper was assessed at 8s. 2d., or about 5*l.* of money of the present value. According to the custom of the time the bell and bell-clapper that caused the death became deodand and were forfeited to the Crown, or rather they had to be redeemed at the full value by the owner, which in this case would be the churchwardens of Ongar.

The church of St. Martin consists of chancel, nave, and south aisle, and is but of small proportions for the church of an old market town that gave its name to a Hundred. This seems to prove that the town did not expand in any material degree during mediæval days after the Norman period. The chancel is but 18 ft. long and the nave 51 ft. The south aisle was not added to the church until 1884, at which date the fabric underwent considerable repair, including the stripping of the walls of rough-cast and the insertion of a new east window in the chancel.

The building shows, however, various interesting remains of considerable antiquity. It has been assumed that, when Richard de Luci, the devoted servant of Henry II., secured Chipping Ongar, he built the church "largely of ruined Roman work." He died in the year 1179. But, at any rate, it may be maintained with confidence that the term *Chipping* Ongar betokens a market town on this site of pre-Norman date, and, further, that it is highly improbable, nay, almost impossible, that such a town, within easy distance of London, would be destitute of a Christian church during the later Saxon period. It is only natural then to look round and see if the fabric bears any trace of Saxon workmanship.

This brings us at once to the important factor in Essex church buildings—the prevalence of brickwork. The county has some noble specimens of ecclesiastical brickwork of the latter part of the XVth and the beginning of the XVIth centuries. Such are the fine towers of Fryerning, Ingatestone, and Rochford, and the porches of Leigh and of the recently described ruined church of Chingford.

But there is a far more interesting brickwork question in connexion with Essex churches than that pertaining to its development at the close of the mediæval period. Those who have made a study of this question are well aware that the once confidently-made assertion as to the disuse of brickmaking in England from the time when the Romans left us up to the XVth century is an error. A visit to the East Riding, notably to Walton, will afford convincing proof that bricks were used in England in the XIIIth century. We are not, however, aware of anything having arisen or been discovered to substantiate in any way the idea, once propounded in an early issue of the Essex Archæological Society's *Transactions*, that the Normans made tiles in England. There are various Essex churches wherein the flat Roman bricks or tiles are much used in what is usually termed Norman workmanship. This use of old Roman material is certainly far more likely—unless other circumstances contradict the supposition—to have been done by the Saxons rather than the Normans. In certain well-known cases the considerable use of Roman material in pre-Norman churches is accepted by everyone—as at St. Martin's and St. Pancras', Canterbury, or at Stone-by-Faversham, Kent. In two cases these Saxon church builders undoubtedly made large use of Roman tiles in turning their arches, notably at Brixworth, Northamptonshire, and also at Britford, near Salisbury. Now at Chipping Ongar there is a large built-up doorway on the north side of the nave, the jambs and turn of which are formed of Roman tiles (Fig. 1). It should be compared with a somewhat similar built-up door or archway in the outer north wall of the fine church of Prittlewell in this county. This doorway, to anyone well acquainted with Brixworth and Britford, looks far more like pre-Norman work than the work of Richard de Luci in the middle of the XIIth century.

Then, again, on the north side of both the nave and on both sides of the chancel are small built-up early lights with a turn of Roman tiles at the top (Fig. 2). These should be compared with somewhat similar lights to the nave of the church of Fryerning; only in this case an unhappy restoration has brought about their rebuilding on a larger scale.

Again, the quoins of this church, both of the west end of the nave and the east end of the chancel, are formed of Roman tiles, as shown in Figs. 3 and 4.

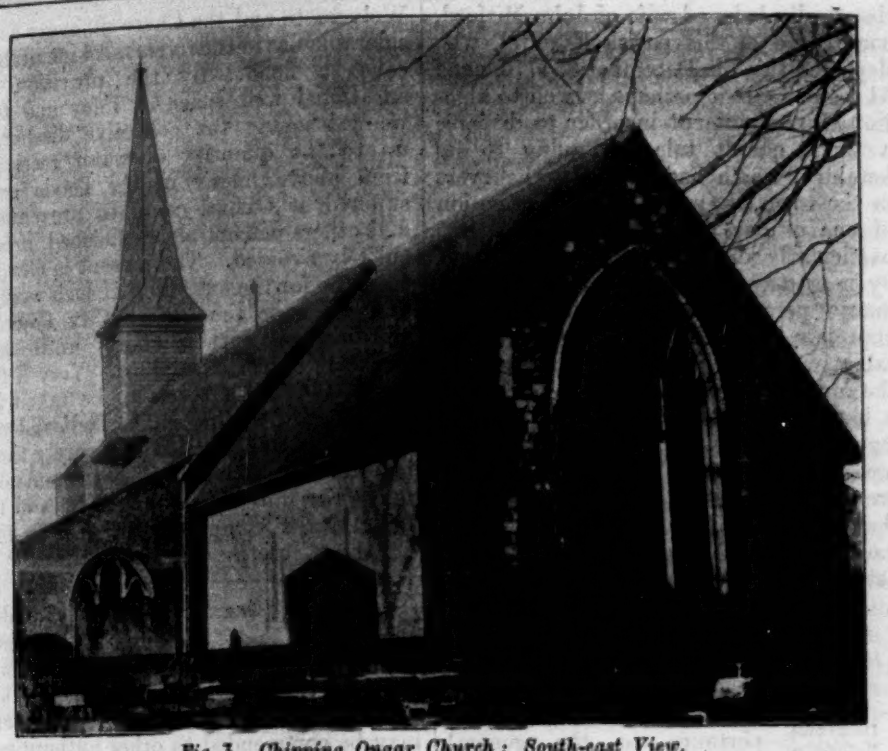

Fig. 3. Chipping Ongar Church: South-east View.

It is exceedingly unfortunate that the original character of the east end of the church has been destroyed by the insertion of a large window, but the "long-and-short" work of parts of four small lights (Fig. 3) seem to be pretty clearly of pre-Norman character. The timber work at the sides and apex of the east gable is obviously of much later date.

On the whole, we incline to the opinion that there is much more likelihood of a good deal of the oldest work of this church being late Saxon rather than Norman. At all events, this fabric deserves closer attention at the hands of capable archæologists than it has yet received. The round-headed plain priests' door on the south side of the chancel is among the early and somewhat puzzling features.

The south side of the chancel is lighted by a graceful triple lancet, with the centre light higher than the side ones. This is in good brickwork. We believe it is possible that this is orginal brickwork of the XIIIth century, though the bricks are somewhat larger than others of that century. If it is of later workmanship, it is a clever reproduction of XIIIth century proportions.

At the west end of the nave is a small modern porch, which partly obscures a debased window. Above that window, in the gable, is a plain early single light, which has now a round head; it has been altered in construction, and probably had originally a lancet head of Henry III. date.

In the north wall of the nave are three two-light pointed windows of XIVth century style; they date from 1884, but are said to succeed others of like construction.

On the north side of the chancel is a small modern vestry. On this side, too, of the chancel, behind the organ, is a three-light window in moulded brickwork, apparently of XVIIth century date. There is also a modern-looking low doorway (reconstructed, we believe, in 1884), giving access to a very small chamber in the thickness of the wall. Inside the chancel at this point, in the north wall, may be noted a small opening, measuring 13 in. by 6½ in., which probably served as a squint from a narrow anchorite's cell.

In the interior of the chancel may also be noted a piscina niche on the south side, with a large grooved drain, of the time of Edward I. There are also remains of a holy-water stoup by the blocked-up north door of the nave. The font is modern. The old tie-beams and king-posts of the nave remain. These and other features of the old roof are probably early XIVth century, but have been much altered. The pulpit has some handsome carving of the first half of the XVIIth century.

On each side of the nave roof are two dormer windows, which, with their wooden casings and neat blinds, have a curiously domestic look; they are probably *circa* 1800 in date.

The timber belfries of Essex are a common and characteristic feature of the churches of the county. The only other county where these are to be found in anything like the same frequency is Hampshire, and there only in certain localities and not generally distributed. Moreover, these western belfries of Essex have an advantage over those of the more southern county, as the square bell-chamber in the former county usually loses its awkwardness by being finished with a low spire. Chipping Ongar is a fair example of the simpler style of late timber work added to an existing building when the desire for more than a single bell swinging in a western cote was strong, and when lack of funds and lack of stone made tower building an exceptional luxury. Externally, in cases like Chipping Ongar, a square, plainly-built bell-chamber is to be seen, striding across, as it were, the western end of the gabled roof of the nave, and projecting some little way down its sides on

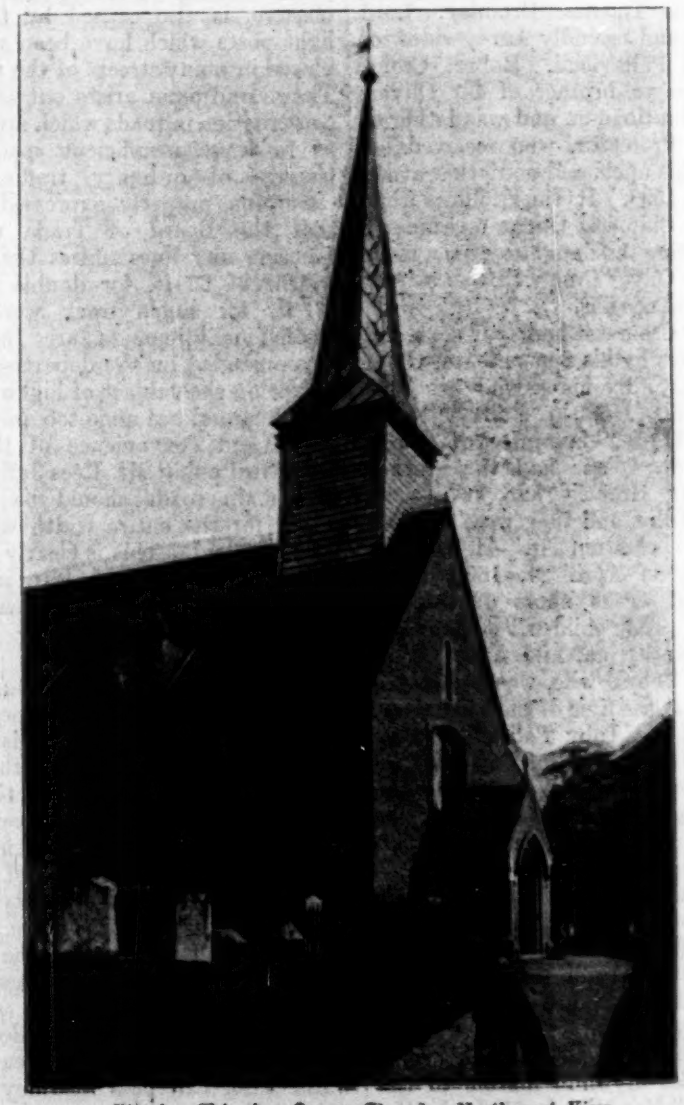

Fig. 4. Chipping Ongar Church: North west View.

the north and south. Here, as is usually the case, it is covered with weather-boarding, which, from its often refreshened coat of light paint, looks fairly modern. The plain square belfry is surmounted by a short octagon-broached spire, covered with diagonally-arranged lead.

But the interior of the church at once shows the age of the construction. A cleverly-arranged framework of massive oak beams rises from the floor level, "capable of sustaining the vibration of a ring of bells for three or four centuries without starting a joint." Here, as in most similar cases, there seems good reason to believe that the timber framework, with its spire-crowned bell-chamber is of the second half of the XVth century.

On the floor of the chancel, within the altar rails, concealed and perhaps preserved by a heavy covering of linoleum, is an inscribed grave cover of decided interest. It is sometimes stated that Jane, a daughter of Oliver Cromwell, the Protector, is buried here; whilst the last edition of "Kelly's Directory" of the county makes the lady the niece of the great Protector. The Latin inscription states that Jane, daughter of Oliver Cromwell, Knight of the Bath (*equitis balniensis*), of Hinchinbrook, Huntingdon, and wife of Toby Pallavicini, Esquire, was buried here on March 24, 1637, aged 42. Sir Oliver was knighted by Queen Elizabeth in 1598; at his great house at Hinchinbrook he several times entertained James I., and probably also Charles I. He married firstly Elizabeth, daughter of Thomas Bromley, Lord Chancellor; and secondly Anne, widow of Sir Horatio Pallavicini. Robert Cromwell, a younger brother of Sir Oliver, settled at Huntingdon, and was father of Oliver, the Protector, who received his name from his uncle and godfather at his baptism in 1599. It thus follows that Jane of the Chipping Ongar monument, instead of being the daughter or the niece of the great Oliver Cromwell was simply one of his first cousins.

Sir Oliver Cromwell had four sons and four daughters by his first wife, of whom Jane was one. By his second wife, the widow of Sir Horatio Pallavicini (a Genoese and great favourite of Queen Elizabeth), Sir Oliver had three other children. Sir Horatio left two sons, Henry and Toby, and they were married when mere children in All Saints, Huntingdon, on April 24, 1606, Toby being several weeks short of thirteen years of age. Their child-wives were their stepsisters Katharine and Jane Cromwell. Jane, Toby's wife, was but eleven years of age at the time of their marriage. Both Henry and Toby Pallavicini were subsequently knighted. The issue of the marriage of Toby and Jane was three sons and a daughter. Horatio, the eldest, born in 1611, is buried by his mother. The floor stone is inscribed:—"Here lyeth the body of that truely noble and religious gentleman Horacio Pallavicini, Esquire, who departed this life on the ninth day of May in the year of our Lord God 1648, being of the age of six and thirty yeares."

Against the south wall of the chancel is a mural tablet of white marble to the memory of "Mrs. Sarah Mitford (the deservedly beloved wife of John Mitford, some time of this parish Esquire), who departed this life December 8, 1776, aged 31 years." It is perhaps as well to mention this monument in order to disperse a fond, quaint tale pertaining to its heraldry, which has not a few believers in the town of Ongar. On the occasion of one of our visits our attention was particularly directed to this monument by a worthy tradesman, who said that many persons came to the church expressly to see it. The arms above the tablet were described by him as bearing the fourfold cognisance of "a flea, a fly, a louse, and a comb," with a singular legend as to their origin! As the arms are now uncoloured and high up, they are somewhat difficult to decipher; but they proved to be a fesse between three moles (Mitford) impaling a chevron between three combs (Botell)!

NOTES.

Dangerous Highways. THREE points of much importance to the general public are now under consideration by the Board of Trade, having been brought to the notice of the department by a deputation from the Roads Improvement Association. The first relates to the erection of posts in the middle of carriage-ways for tramway purposes, a very unnecessary arrangement, which encourages drivers of light vehicles to race for the purpose of getting between heavy vehicles and the posts. This dangerous practice, we may observe, is also caused by the electric light posts which have been so unwisely placed in many streets of the metropolis. The second point arises out of tramway construction in roads which are so narrow as to leave insufficient space for the passage of ordinary traffic. Colonel Crompton properly expressed the hope that the Board of Trade would not sanction any lines unless the minimum widths of 33 ft. for double track and 27 ft. for single track were assured. These measurements are the minima recommended by the departmental committee on the subject of highway administration, and are none too ample for the safety and convenience of the public. As a third point, Mr. Rees Jeffreys urged that main roads should be uniformly paved for the entire width where tram lines are laid. This is clearly desirable, although perhaps of less importance than the other matters mentioned.

Flood Prevention in the Thames Valley. AT the present period of the year attention may well be directed to measures intended to minimise the floods that will surely devastate portions of the Thames Valley in a few months' time. The Oxford City Council has recently been able to form the opinion that, in addition to the general inadequacy of the river to carry the required quantity of water in times of heavy rain, there are other causes which aggravate the trouble. For instance, figures furnished by the Thames Conservancy make clear the fact that the Godstow weir alone is able to deliver into the Oxford area far more water than can pass at Iffley and the weirs. Hence, with water coming from Wolvercote and the Cherwell, every considerable rise in the rivers must inevitably cause a flood. By the provision of additional weir space at Iffley and the weirs bringing the collective discharge up to the quantity of water received from above, many of the floods now suffered at Oxford could be prevented, and others perceptibly diminished, if not entirely avoided. The present is clearly the time for the execution of such works, and we hope the Oxford City Council will not relax their efforts until this desirable object is attained. Very little practical interest seems to be taken in the matter by other public bodies along the Thames Valley, and it is surely time for the appointment of a Commission to inquire into the whole subject and to formulate a comprehensive scheme for dealing effectively with flood waters.

New Building By-laws, Hastings. THERE can be little doubt that building regulations ought to be revised from time to time, and the example of the Hastings Town Council is one which may be commended to other authorities. Old regulations may prove to be either inadequate or unduly restrictive; in the former case narrow and inconvenient streets may be constructed and insanitary or unstable buildings may be erected, while, in the latter case, the cost of building may be unduly increased or, certain materials being prohibited, there may be little scope for variety in architectural treatment. The new Hastings by-laws repeal certain clauses in the by-laws of 1882 and 1894 and substitute others dealing with the width of streets, the construction of walls, floors, and roofs, and the drainage of buildings. The rules for hollow walls are as moderate as possible, and, under certain conditions, half-timber work and tile-hung timber framing may be used for external walls. The scantlings of timbers for floors, roofs, etc., are carefully specified, but provision is made for variation; thus, while the scantlings of floor-joists for different spans are given in detail, the depth and breadth may be varied, or other sizes may be adopted, and the spacing of the joists be increased or diminished, provided that the same strength of floor is obtained. The rule which provides that the sizes "apply only to . . . any species of fir or pine of sound and good quality" is open to criticism, as it places pitch-pine and white deal or spruce on the same footing, whereas the transverse strength of the former is at least 50 per cent. more than that of the latter and is equal if not superior to that of oak.

Technical Instruction in Germany. IN a report published in July by the Foreign Office, Dr. Frederic Rose, British Consul at Stuttgart, gives full details of special technical schools for the ceramic industries in Germany. We have nothing like them in this country, notwithstanding the progress made in technical education. At the present time there are four schools of the kind in Germany, all situated in the midst of the industries they are intended to promote. Their object is to afford thorough theoretical and practical instruction, and to qualify students for future positions

as owners, managers, foremen, and artists in various branches of the industries concerned. For details of the organisation, methods and courses of study of these schools we must refer our readers to Dr. Rose's excellent report. We may remark, however, that in the school at Lauban, devoted exclusively to the interests of brick-making and allied industries, the curriculum includes such subjects as mathematics, physics, chemistry, mineralogy, electro-technics, drawing, book-keeping, industrial legislation, and other more or less useful theoretical studies, as well as practical tuition as to the properties of raw materials and the most efficient methods of using them in manufacture. It will be seen, then, how thorough is the instruction available. A noteworthy point is that the authorities, and not the manufacturers, first recognised the need for the schools mentioned, a tendency which is frequently observable in the case of minor industries in Germany and elsewhere.

The Sudan.

CONCURRENTLY with the efforts still being made for the complete development of Egypt proper, the Government is now actively engaged in the prosecution of works and measures for the regeneration of the Sudan. An expert Commission, appointed to decide between Sheikh Barghoot and Suakin as a port and the terminus of the railway to be constructed from Berber to the Red Sea, has practically arrived at a decision in favour of the former place, which offers excellent anchorage, and has an abundant supply of fresh water. Whichever of the two sites may be finally selected, it is certain that the new port will be of considerable importance, and will serve in a marked degree to hasten the prosperity of the country for whose products it will be the natural outlet. In view of the construction of the railway the Government is taking active measures for the sale of lands within easy reach of the new line. Those who undertake the work of development will be required to lay out the land for basin irrigation, and in such a way as not to interfere with any larger schemes of irrigation as may ultimately be adopted in the neighbourhood. All irrigation drainage and kindred works must be constructed in accordance with plans to be approved by the Public Works Department. Winter pumping for watering crops after the flood has subsided will be permitted so long as no interference is caused to the supplies required for Egypt and the remainder of the Sudan; but, unfortunately, no summer supplies can be guaranteed. This serious drawback will doubtless be removed in due course by the construction of reservoirs on the upper reaches of the Nile.

New Names for Old Streets: Stepney Borough.

THE Borough Council are formulating a scheme for re-naming certain streets which will contribute to preserve the memory of some historical personages associated with Stepney parish and the vicinity. Whilst the preliminary researches are not yet concluded we gather that the Council are thus far minded to adopt the following changes of nomenclature: Morgan-street, Commercial-road, St. George's-in-the-East, will under its new style of Hessel-street, commemorate the martial exploits of Phœbe Hessel, who was born in Stepney parish in the year 1713, and died at Brighton on December 12, 1821. She enlisted in the Fifth Foot, now the Northumberland Fusiliers, and was wounded at Fontenoy—as is recorded in her epitaph, transcribed in Brayley's "Topographical Sketches of Brighthelmston." Hugh de Fulbourne, rector of Whitechapel in the earlier half of the XIVth century, will give his name to Thomas-street, Whitechapel-road; Thomas-street, Limehouse, is to be called after Lake, a resident, who served as Secretary of State to King James I.; whilst the memory of an earlier inhabitant of Stepney, *temp.* Edward I., one de Waley, will be revived by the calling of Mary-street, Whitechapel, after him, and York-road, Commercial-road East, under its new style of Haddock-road, will remind us of Sir Henry Haddock, a local celebrity in pristine times. The project we describe moves in the right direction, and is one of many indications that the shade of Bumble which brooded over the vestries and local authorities is gradually being dissipated from our midst. It has, moreover, the merit of practical utility, inasmuch as it tends to reduce the re-duplication of street-names in London—a source of frequent error and confusion.

Sir Francis Chantrey's House in Pimlico.

THE block of shops and residential flats to be erected after Messrs. Read and MacDonald's plans and designs will stand on the site of three or four houses each of which is worthy of a passing notice as associated with the careers of Chantrey and his assistants. The ground lies at the corner, north-east, of Buckingham Palace-road and Eccleston-street. Of the houses that have been pulled down, one was occupied by Chantrey from 1814 until his death in 1841. The house was originally Nos. 29 and 30, Lower Belgrave-place, which Chantrey converted into one, and he added a studio, a sculpture gallery, and a foundry for working in bronze. There he carved the busts of Roscoe and Canning, in Liverpool Town Hall; Sir Joseph Banks, in the National Collection; James Watt, at Glasgow; Lady Louisa Russell, at Woburn, and Sir Walter Scott; the statues of Pitt, in Hanover-square; James Watt, in Westminster Abbey; George IV., in Trafalgar-square; and the Duke of Wellington (finished by Weekes), Royal Exchange. In 1831 Soane built the ante-room, lighted by a lantern in the roof, of the sculpture gallery. The house was renumbered as No. 1, Eccleston-street, and again as No. 102, Buckingham Palace-road. Another of the houses, formerly No. 27, Lower Belgrave-place, but latterly No. 98, Buckingham Palace-road, was the home of Allan Cunningham, the poet, whom Chantrey employed during nearly thirty years as his secretary and foreman mason, and to whom he bequeathed 2,000*l.* and an annuity of 100*l.* In the adjoining house lived Henry Weekes, R.A., when Chantrey's principal assistant. After his master's death Weekes completed some of the former's commissioned works, and removed to Chantrey's house, where he remained until his death in 1877. At No. 98 was born, in 1816, Peter Cunningham, a son of Allan Cunningham, who, on leaving Christ Hospital School, became a clerk in the Audit Office, and compiled the "Handbook of London" (1849-50). No. 13, Eccleston-street, whither Chantrey removed from No. 12, Charles-street, St. James's-square, on his marriage in 1807, has been pulled down.

EXHIBITION OF STUDENTS' WORKS AT SOUTH KENSINGTON.

TWO VERY instructive exhibitions, indicating the standard attained in the official art education of the nation at the present time, are to be seen at South Kensington, and will be open during the month of August.

The national art competitions are located in the Indian section of the Victoria and Albert Museum, and consist of an excellent selection, from important art centres, of works comprising designs in architecture, studies of old buildings, examples of textile fabrics, metal work, faïence, enamels, wallpapers, modelling of figures, and designs for posters. In the architectural section a bronze medal is awarded Mr. J. H. Gibbons for some good measured drawings, and the same author obtains a silver medal for drawings of a large painted rood screen, a good design in many respects and well shown in a practical, detailed way. Mr. A. R. Atkinson sends his design for the treatment of a crescent in the streets of a large town, which was submitted at the R.I.B.A. exhibition in January last and received our favourable comment; the author is awarded a bronze medal for this work and a silver medal for a clever design for a covered bridge, a Gothic feature spanning a small river. The effects are perhaps hard and rigid, but the drawings are excellent. Mr. A. R. Richardson gains a similar award for his design for a "Pavilion in a Public Park." A good design is "A Town Bank," by Mr. S. F. Parsons, which wins a bronze medal. Excellent work is shown in the time studies or examination in design, and the subject, a village club, is admirably treated by several students. The works in the applied arts are numerous and of considerable merit, but space does not permit of detailed reference.

The larger and perhaps more important exhibition, that of the works of students at the Royal College of Art, is to be found in an iron building known as "Block C," situated behind the Natural History Museum. The exhibits are selected from the studies made in the Architectural School, the Design School, the Craft Classes, and the Painting School. It is noticeable that a good training is given to students in architecture, under Professor Beresford Pite, by the thorough manner in which the subjects are worked out. The study of old buildings from actual example forms an important part of the instruction, for we find some scale drawings and great sheets of full-size details of the Mausoleum at Halicarnassos, which represent the work of a group of students to whom special facilities were given by the British Museum authorities. Another subject, an English Renaissance building, the Church of All Hallows, Lombard-street, E.C., now threatened with demolition, has been carefully measured. In this case the students specialising in architecture made the scale drawings of the fabric, while others following applied design have prepared full-size studies of the various carved fittings and other ornaments. Large sheets of mouldings show that Gothic architecture is practically studied in diagram and from actual example.

Coming to designs, the first year students' work cannot be said to rise above average merit. Subjects are set, based upon lectures given on the various styles of architecture. Upon the classic lectures is based the design for a colonnade, in which the student was directed to show the picturesque treatment of repeating symmetrical forms, and much good work in general ideas is to be seen.

Lectures on domed buildings formed the basis of the design for a small domed church in a British colony. Here scale drawings only are given, and the plans do not show any great imagination. In both subjects, however, Mr. E. Healey's work is of considerable merit.

A vaulted country church arises out of the mediæval lectures. In this case a plan was

given, and we should imagine that the heights were fixed; but no design has any country feeling in it, and only one student shows any knowledge of stone vaulting—scarcely a first year subject.

In domestic design, where we should have expected the most promising work, the standard falls considerably. In all cases plans are supplied, but permission is given to vary the arrangement; this, therefore, resolves the design into a problem in elevations, and, to a large extent, eliminates the difficulties of construction. It, moreover, tends to deaden the student's powers of imagination. The results of this process are borne upon the face of the actual work exhibited, for, with slight exception, there is little merit in the designs for a cottage, a country house, a small school, and an almshouse college. The best work is, perhaps, to be found in the designs for a fountain, some of which are excellently drawn to full size. In this subject it is seen that the students receive preliminary art training before entering the Royal College, for the drawing of sculpture and other embellishments is much in advance of that of the architecture.

The work of the second and third year students, while showing greater departure from type, does not mark, generally speaking, any great advance in design. The drawings of a town house are dull, and those of a domed church disappointing. The best work is seen, however, in the decorative treatment of an entrance-hall, staircase, etc., of a mansion. Some of these schemes have well-drawn designs in colour decoration, while others are limited to panelled and other wood fittings only. The work of Messrs. A. E. Martin, George, and H. Morley is excellent. The last-named, as travelling student, exhibits colour sketches and studies made during an Italian tour.

The work of the Design School is seen in a very comprehensive show, the subjects of which are too numerous for reference in this short review. Enough is seen, however, to demonstrate that the school is doing good work in the applied arts under Professor Lethaby.

The most attractive part of the exhibition is the work of the Painting School students, which bears an unmistakable influence of the master, Professor Moira, who directs the studies. Apart from the life subjects there are many decorative works of a very high order. The series of colour treatments of lunettes has produced very interesting designs, the subjects of which are supposed to represent some historical incident from the student's own district. Mr. W. G. Murray's arrangement of the semicircle is the best in our opinion; the grouping and massing of the colour and the interests, is both satisfying and clever.

The decoration of an intersecting barrel vault, presumably, of a church, is the subject which possesses the greatest merit of the exhibition. The various schemes consist of small-scale coloured models of the vault and full-size cartoons of the chief figures, and it is interesting to note that a large proportion of lady students are represented in the excellent work exhibited; amongst whom Miss Browning, Miss Giraud and Miss Pickavance are prominent. The work of the modelling class, under Professor Lantèri, which contains gallery and decorative pieces and sculpture, is not the least interesting of a very interesting exhibition, which we can recommend to all our readers as worthy of a visit.

These works illustrate the systems and processes in operation for the study and application of architecture and the allied arts by British students, and the results may be said to be satisfactory, judged from the standpoint of the encouragement of individuality in design.

Other institutions that deal with architectural education—with the exception, we suppose, of the new day school of the Architectural Association—are handicapped by the very slight hold they have over the students working at their classes or for their examinations. Here we have the result of three years systematised study. A student entering the school is trained immediately to make measured drawings and to think of them as practical working drawings such as a modern workman would require so as to reproduce the subject. A beginning is made with wooden panelling and ornament from English specimens in the Museum, taking examples in historical sequence, and observing the introduction of mitring and mouldings upon the framings and the alteration of character in the ornamental forms derived from those employed in other materials, as the arcading and shafts of stonework, when used in woodwork, and so on to larger and more difficult subjects in the museum.

The study of design is enlivened by courses of lectures to each class of students, showing historical illustrations with demonstrations, as well as by visits to buildings of interest, suitable to illustrate the lecture and the subject for design. During their visits the students are instructed in making notes and sketches. Architectural perspective and pen-and-ink drawing are taught and encouraged. A student at the end of a three years' course of study has come into contact with architecture ancient and modern, and has heard discerning criticism and reference to modern requirements and methods of work. He has had a chance of learning to draw intelligently, both for his own pleasure and that he may be able to express his ideas and wishes to a workman on paper. The running accompaniment of lectures and demonstrations have taught him history and the elements of design, so that at the end of a course he is fitted to begin to learn the practice of architecture. How does this compare with the usual form of pupilage in an architect's office? There are shining exceptions, but too often, at the end of three years' pupilage, a young man is practically useless, and is without a foundation on which to place his subsequent enquiries and experience. The day school system has its disadvantages; some of them could be counterbalanced, if it were possible, by so many months' apprenticeship to competent clerks of works on big buildings in the course of erection.

Architectural pupils also have the advantage of excellent tuition in the allied crafts already referred to, a knowledge of which is essential to an architect in practice.

LETTER FROM PARIS.

THE Académie des Beaux-Arts has awarded the "Grand Prix de Rome" in sculpture to M. Larrivé, a pupil of M. Barrias. This young sculptor, who obtained a medal of the third class in 1901, exhibited at this year's Salon a bronze group under the title "A la Carrière." The "second grand prix" in sculpture went also to a pupil of M. Barrias, M. Aimé Blaise. In painting, the "grand prix" has not been awarded this year.

While the "Vieux Paris" Committee is working with praiseworthy zeal to preserve the historical remains of the earlier city, certain practically-minded spirits are endeavouring equally to reconcile the modern requirements and future aspirations of the city with respect for its old associations. Hence the formation of the "Nouveau Paris" Committee, which has found even in the ranks of the Municipal Council supporters who are determined to follow out what is called the "transformation rationelle" of Paris, professing at the same time every regard for matters of historical interest. An independent worker in the same direction is M. Eugène Hénard, who was a valued collaborator of M. Bouvard in the 1900 exhibition, and who has successively devoted himself to the solution of difficult cases in which there was a conflict between utility and sentiment. When the demolition of the fortifications was first talked of, he proposed a plan for a grand boulevard surrounding the whole city on the line of the fortifications. Later on, the question of the preservation of open spaces, so necessary for the hygienic condition of a city, led him to publish a comparison between London and Paris, in the matter of public gardens, which was to the disadvantage of the French capital. Lastly, having considered the means for utilising the Champ de Mars and the Galerie des Machines, M. Hénard has taken up the question of the Palais Royal, a quarter which is losing its old attractions for want of direct communication with the rich and populous quarters of the city. This scheme, which he calls the "nouvelle grande croisée de Paris," is to provide a new central avenue of communication, traversing the Palais Royal but without interfering with its architecture, and leading into the Rue Royale at one end and the Rue Sébastopol at the other end. This avenue, which he proposes to call the "Avenue de Palais Royale," would be intersected at a right angle by an "Avenue de Richelieu" formed by widening the old Rue de Richelieu. M. Hénard, who has studied the scheme very completely, estimates its total cost at about 35 million francs; a large expenditure no doubt, but one which it is considered would be justified by the great advantages to the centre of Paris that would accrue from the opening up of old quarters which would have a new life infused into them; and the prevalent opinion is that historical considerations ought not to stand in the way of so great a public improvement.

The following is the scheme definitely adopted by the Municipal Council for re-arrangement of the Champ de Mars. At each side, along the Avenue Suffren and the Avenue La Bourdonnais, a space 40 mètres wide will be reserved for a first line of buildings, with shops on each face. Then will come an inner boulevard 25 mètres wide. A second line of buildings 20 mètres wide will follow, but restricted to a height of 15 mètres, and without shops on the side next the Park of the Champ de Mars. The esplanade of the Champ de Mars will be cut from east to west by two broad roads on the axes of the Rue de Grenelle and the Rue St. Dominique respectively, and all the portion between the first of these roads and the river will be laid out in "Jardins Anglais," while the opposite space, down to the Ecole Militaire, will be laid out in "Jardins à la Française," with large spaces reserved as play-grounds. A free space 60 mètres wide will be reserved in front of the Ecole Militaire, so that Gabriel's fine façade will, as before, close the perspective at the end of the Champ de Mars. This scheme of course necessarily implies the demolition of the Galerie des Machines, which however may very probably be rebuilt on some other site, where it will be useful without interfering with architectural effect.

The monument to Pasteur, by Falguière, has recently been inaugurated, but it is to be regretted that it is not in scale with its site, and that in the wide space of the Place de Breteuil, of which it occupies the centre, it seems very much lost, and it will be necessary to give it some kind of border or framework of artificial plantation, in order to give it the requisite emphasis.

The "Quartier de la Cité" will shortly be the scene of some important new works. In the first place, the Pont Nôtre Dame, which is a danger to the river traffic, is to be pulled down and rebuilt on different lines, at an estimated cost of 1,300,000 francs. Secondly, it is proposed to demolish the Morgue, situated at a point in the Ile de la Cité where it interferes with the view of Nôtre Dame. The removal of this building will allow of the garden of the Archbishop's palace being prolonged to the river bank, opposite the Ile St. Louis, and thus flowers and trees will take the place of a building of gloomy associations, which could more suitably be rebuilt near the still existing building of the ancient Hôtel Dieu.

Among other contemplated improvements may be mentioned the proposed removal to a site outside the fortifications of the Army Remount Depôt, which at present occupies an extensive site between the Parc de Montsouris and the Porte d'Orleans. The Municipal Council has been in negotiation with the War Department to obtain this site for the erection of artisans' dwellings, leaving the central portion as an open square for games and gymnastic exercise.

M. Georges Trugard, a decorative sculptor of great talent, has died at the age of 56. He was a member of the Société des Artistes Français, and obtained a gold medal at the 1900 exhibition, and also medals at various exhibitions of the Union Centrale des Arts Decoratifs. Among his more important work may be mentioned the carved decorations of the Eden Theatre, the Thêâtre des Arts at Rouen, the Municipal Theatre of Epernay, the Salle des pas Perdus of the Municipal Buildings at Rouen, and the Salle des Fêtes at the Paris Exhibition of 1900.

BRADFORD DISTRICT BATH SCHEME.—The Mayor of Bradford (Alderman David Wade) opened the new baths in Drummond-road, Manningham, on the 25th ult. The buildings are situated at the junction of Drummond-road and Carlisle-road. In the centre is a swimming bath, varying in depth from 3 ft. 6 in. to 6 ft. 6in., and 60 ft. long by 20 ft. broad. Separate provision of slipper and other baths for males and females is made on each side of the swimming pond, to which there is access from both wings, with arrangements for shutting off each department as required. On the male side there are three slipper baths and fifteen douche, and on the female side two slipper and eleven douche baths. Mr. Booth was the contractor. Mr. F. E. P. Edwards, the City Architect, was architect for the work.

THE ROYAL ARCHÆOLOGICAL INSTITUTE AT BRISTOL.*

FRIDAY, July 22, was devoted to a visit to Chepstow and Tintern. The party left Bristol at 9.45 a.m., and, on arrival at Chepstow, proceeded on foot to the parish church, which was described by the Vicar, the Rev. E. J. Henslay and Mr. Harold Brakspear. It consists of the nave only, now despoiled of its aisles, of the church of the alien priory of Striguil, which was founded as a cell of the Norman Abbey of Cormeilles soon after the Conquest. The nave, which is six bays long, has arcades of plain and simple character of a date, *circa* 1100, with a low triforium of two coupled arches and a clerestory. Both the aisles and the main span seem to have been intended to have been vaulted. The central tower fell in 1701, and only the base of its north-west pier is left. With its materials an effective new tower was built in the westernmost bay. The present north transept and chancel are modern. There are good tombs with effigies to Henry Herbert, Second Earl of Worcester (*ob.* 1549), and his countess, and to Thomas and Margaret Shipman, 1620. The font is an interesting one of the XVth century, with pierced pinnacled buttresses round the stem.

Chepstow Castle.

The grand remains of Chepstow Castle were next inspected, under the guidance of Mr. W. H. St. John Hope, who pointed out its identity with the "Castellum de Estrighoiel," or Striguil, mentioned in Domesday Book as the work of William (FitzOsbern), Earl of Hereford. The castle of Earl William, Mr. Hope thought, did not include the lower or outer bailey, which was added in the XIIIth century, and the plan and configuration of the ground seemed to point to the former existence of a rocky mount on the platform now called the barbican. Mr. Hope also showed that the so-called keep was really the great hall, and he saw no reason against its being actually the work of Earl William, and, therefore, prior to 1072, when the earl was killed in Normandy. The Count de Lasteyrie, while agreeing that the so-called keep was the hall, was unable to assent to the early date claimed for it, and also expressed his inability to follow the reasons for the former existence of the moated mount at the western end. After inspecting the remains of the beautiful hall, etc. in the lower ward, and the great tower known as Martin's, or Bigod's, the party adjourned for luncheon.

Tintern Abbey.

Shortly after 2 p.m., brakes being in readiness, the journey was continued to the well-known ruins of Tintern Abbey, where Mr. Harold Brakspear briefly reviewed the history of the Abbey and the salient features of its architecture and arrangements. He also gave reasons for believing that the first church was a small one with an aisleless nave like the earliest church at Waverley, a theory that had been clearly proved by the discovery only a few days before of the foundations of the south wall of the nave exactly on the line indicated by him. The Abbey buildings are now vested in the Department of Woods and Forests under the charge of Mr. Philip Baylis, Deputy Surveyor of the Forest of Dean, and special efforts are being made to preserve everything as it stands, without loss to its beauty and picturesqueness. At present a tall scaffolding envelops the great east window, the central mullion of which is in a critical condition.

The party subsequently returned by special train to Bristol.

In the evening a conversazione was held in the Bristol Museum by invitation of Mr. Francis Fox, President of the Bristol and Gloucestershire Archæological Society. By kind permission of the Lord Mayor the splendid series of swords, maces, and other civic insignia, as well as the valuable plate, was exhibited, and briefly described by Mr. Hope, who called special attention to the three earliest swords as being genuine productions of the XIVth and XVth centuries.

Bath Buildings.

On Saturday, the 23rd, the party left Bristol by the 9.35 a.m. train for Bath. Here a visit was paid first to the Roman baths, where, in the unavoidable absence of Mr. F. Haverfield, the arrangements were described by Mr. Hope, who pointed out the chief differences between this very perfect example of thermal baths and those of the ordinary type, based on a similar system to the modern Turkish bath, found at Wroxeter, Silchester, and elsewhere. The wonderful collection of carved and moulded architectural remains, which are now being admirably arranged by the authorities in the practically vacant space north of the great bath, excited considerable attention.

The Abbey church was next visited, and described by Mr. C. R. Peers, who briefly reviewed its history from the foundation, and pointed out the leading architectural features. The present church, Mr. Peers showed, was begun by Bishop Oliver King after 1495, and completed sufficiently for the services to be held in it before 1539, and occupied the site of the nave only of the Norman church that preceded it. Some of the bases of this remain under the floor, and have been exposed for examination. At the suppression of the Abbey the church and buildings were sold, but the unfinished shell of the church was subsequently given to the mayor and citizens by Edmund Coulthurst, and in 1572 begun to be repaired and completed by Mr. Peter Chapman. Much was done to finish the building by Bishop Montague, 1608-16, but the actual completion was not effected until some thirty years ago, when the nave and aisles were vaulted by Sir Gilbert Scott.

Charterhouse Remains, Hinton.

After luncheon, carriages were in readiness to convey the party to Hinton, where Mr. Hope pointed out the chief features of the remains of the Charterhouse, one of the nine English houses of this Order. This was originally founded by William Longespée, Earl of Sarum, in 1222, at Hethrop, co. Gloucester, but moved to Hinton in 1227 by his widow, the Countess Ela. The buildings are said to have been completed in 1232, but only two isolated and half-ruined blocks now remain. The one contains the chapter-house, which, as usual, had an altar, with the sacristy and treasury above, now converted into a pigeon-house. The other is a vaulted undercroft, consisting of two chambers—a larger, and a smaller with a fireplace, and perhaps served as the frater and kitchen respectively. The church, which was vaulted, adjoined the chapter-house on the north, and the great cloister, with its circuit of the cells and gardens of the monks, lay to the south. Mr. Hope pointed out that the existing remains belonged to the *domus superior*, or upper house of the monastery, which also possessed, like Witham, a *domus inferior*, or lower house, known as the frary, about half a mile off, on the banks of the Frome, for the accommodation of the lay brothers, who there lived under the superintendence of the *procurator*. Of this nothing is now left. Some remains of the gatehouse of the upper house are incorporated into the modern mansion upon the site.

From Hinton the drive was continued past the fine XVth century hostelry at Norton St. Philips to Farleigh Hungerford, where the chapel of the destroyed castle, or fortified manor-house, was inspected under the direction of Mr. Brakspear, who called attention to the interesting series of Hungerford tombs, and the collection of Commonwealth armour displayed on the walls.

The journey was then resumed to Bradford-on-Avon, which, from its having been visited by the Institute so recently as 1887 from Salisbury, had not been formally included in the programme. So many members, however, expressed a desire to again inspect the place that a halt was made to allow of visits to the Hall, the parish and Saxon churches, and the Barton farm and barn.

The party subsequently returned to Bristol by the 6.41 p.m. train.

Wells Cathedral, etc.

At the evening meeting Mr. Hope read a paper on the architectural history of the cathedral church of Wells, with special reference to the site of the earliest church, and the building of the present structure. From the evidence of the topography of the city, Mr. Hope showed that the earlier building probably crossed in an oblique direction the site of the present cloister, and continued to be represented until late in the XVth century by the "Lady Chapel in the cloister." This perhaps included a portion of the older structure, since it retained its obliquity of axis as compared with the present church. This latter, Mr. Hope contended, could be shown by the recent researches of Canon Church among the Chapter muniments to have been begun on a new site by Bishop Reginald (1174-91), and slowly carried on during the ensuing episcopate of Bishop Savaric, who may have completed its Lady Chapel. Under Bishop Jocelin, who succeeded in 1206, the building practically stood still on account of his long exile, the interdict, and other causes, and was not continued until 1220, when a huge grant of oak trees by the King "for the making of the limekiln," points to the beginning of some new work on a great scale. This, Mr. Hope believed to be the west front, which was probably completed as high as the roofs at the bishop's death in 1242, as well as most of its magnificent and unrivalled series of statues and sculptures. By the aid of a large plan with movable pieces Mr. Hope also explained the later alterations and additions to the church, as a preliminary to the forthcoming visit of the Institute to the building itself.

On Monday, the 25th, the party went by special train to Wells, and on arrival made its way on foot to the fine parish church of St. Cuthbert. This consists of a XIVth century chancel of four bays, with somewhat later aisles of three bays, north and south transepts of the XIIIth century, a nave and aisles of seven bays, with south porch and an exchequer or treasure-house opposite on the north, north and south chapels west of the transepts, and a western tower; there is also a small vestry north of the chancel. The architectural history was explained by Mr. C. R. Peers, who pointed out the curious manner in which the original XIIIth-century arcades had been taken down and rebuilt stone by stone, in the XVth century, when the pillars were lengthened by some 7 ft. The church had also undergone a considerable remodelling at the same time, and the stately western tower was then built to take the place of the older one at the crossing. Mr. Peers also called attention to the mutilated reredoses of the Trinity altar in the north transept, and of the Lady Chapel in the south transept. The latter was made by contract by John Stowell, freemason, of Wells, in 1470, and contained an elaborate representation of the Tree of Jesse and Genealogy of Our Lord. Many interesting painted and gilded fragments of the statues, discovered during a restoration of the church in 1848, are stacked away in the aisles.

The cathedral church was next visited under the guidance of Mr. Hope, who pointed out the chief features of interest and the various stages of its architectural history. On the invitation of Sir H. Howorth, the Count de Lasteyrie expressed his views upon the building. While agreeing with Mr. Hope that the work had been continuous from east to west, he was inclined to regard the transepts and nave as Bishop Jocelin's work, and the west front and its sculpture as later than his time. Mr. Hope, in reply, pointed out the use throughout the transepts and nave of the square abacus, and the general resemblance of the work to that at Glastonbury, which could be dated to 1184-1189.

After luncheon a visit was paid to the Deanery, which was inspected under the guidance of the Dean, Dr. Jex-Blake. The fine hall of the Archdeacon's house, now the Theological College Library, and the picturesque street of houses forming the Vicars' Close, with its ancient chapel, hall, etc. were next examined, and, after viewing the exterior of the cathedral church and the sculptures of the west front, a halt was made at the Bishop's Palace, the chief features of which were described by the Bishop of Bath and Wells. The party afterwards returned to Bristol by special train. The concluding evening meeting was held at the Palace of the Bishop of Bristol, when the Bishop read a short paper on the history of the See, and votes of thanks were passed to all those who had assisted in carrying out so successfully the Bristol meeting.

Tuesday, the 26th, the concluding day, was devoted to a visit to St. Pierre, Moyne's Court, and Mathern, and to Caerwent and Caldicot. At St. Pierre the manor house was first examined, by the kindness of Major and Mrs. Stacey. The buildings are arranged round a courtyard, entered by a good but plain Tudor gateway, but have been much modernised. The adjoining parish church is of early Norman date, with some interesting coffin slabs. A walk across a couple of fields, past the site of a large moated homestead, brought the party to Moyne's Court, a picturesque gabled house, built by Francis Godwin, Bishop of Llandaff, in 1609. In front of the house is a pretty enclosed garden, entered by a simple gatehouse of the XIVth century. The walk was continued across to

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* Continued from last week.

the fields to Mathern, where the parish church of St. Tewdric was first visited, and described by the Rev. W. Davies. The building consists of a XIIIth-century chancel and nave, with north and south aisles, and south porch of late XIVth-century work, and a western tower of the XVth century. The nave and aisles have good wagon roofs. The church is reported to be the burying place of Theoderick, King of Morgannek, commonly called St. Tewdric, who was accounted a martyr through his having been slain in a battle against the pagan Saxons at Tintern in 600.

The ancient palace of the Bishops of Llandaff, which adjoins the church, was next inspected by the kindness of the owner, Mr. Tipping, who also lucidly described its history and arrangements. It includes the remains of a courtyard house of the XVth century, with a three-storied tower-porch, but the hall wing has been destroyed, and the house generally altered in late Tudor times. Part of an earlier house of the XIVth century is also preserved, with the remains of the gatehouse by which it was entered. After inspecting the beautiful gardens of the house, the party returned to Chepstow for luncheon.

The afternoon was devoted to a visit to Caerwent, where the abundant traces of the Roman town, now in course of systematic excavation, were inspected under the guidance of Mr. A. T. Martin and Mr. T. Ashby, jun. Special interest was taken in a newly-discovered gateway in the south wall. From Caerwent the journey was resumed to Caldicot Castle, the many interesting features of which were pointed out by its present possessor, Mr. G. W. Cobb.

The party subsequently returned to Bristol, and a most successful meeting was thus brought to a close.

THE SANITARY INSTITUTE CONGRESS.*

SECTION II.—ENGINEERING AND ARCHITECTURE.

THE first sitting of this section was held on Wednesday in last week, under the presidency of Prof. Henry Robinson, M.Inst.C.E., who, in the course of his presidential address, said he recognised that the subjects which interested all those who were engaged in advanced sanitary work in engineering and architecture covered a very wide area, and therefore he would confine his remarks to those matters with which he had to deal with in his professional life. In advising as to the expenditure of public money on sewage outfalls there was abundant data now to determine the right system for each place. He was quite confident from his experience that the conditions varied sufficiently to require intelligent and impartial consideration to be given as to which of the several systems or combination of them best met each case, as it was too often the practice to apply an arrangement of works, or a system, to an outfall because it was applied successfully somewhere else, although the conditions varied materially. The want of proper provision for dealing with storm water at outfalls was often a fruitful source of trouble. He had examined several sewage outfalls where the results were unsatisfactory, and had found the failure mainly attributable to the fact that the discharge at the outfall, through defective construction of sewers or otherwise, more than three times the normal dry weather flow, which the Local Government Board required to be dealt with as sewage, prevented whatever system of treatment was in operation from having a chance of success. Waste land of a pervious character, or rough filter beds, if no land was available, should receive discharges due to abnormal rainfall, which should be carefully differentiated from the normal flow of sewage. In any arrangement of sewage disposal works a sedimentation tank is now regarded as useful in order to arrest the suspended inorganic matters in sewage which tend to clog any kind of bed. The neglect to adopt this simple preliminary treatment had caused most of the difficulties in regard to the silting up of bacteria beds. It had been found that fluctuations in the purity of effluents from bacteria beds will occur when the quality and quantity of the fluid applied varies considerably, and this was only what might be expected. New bacteria beds required to be treated at the outset with small quantities of fluid until they have become ripe. Experience had shown that with a given area of land a much larger volume of foul fluid could be bacterially treated by the trickling or sprinkling system than by the contact system. In either case the selection of suitable material for the beds is all important, and that which is used must be governed by the locality. In determining what standard of purity of effluent should be required the circumstances of each case would have to be dealt with. Perhaps some minimum standard might be fixed, but there should be no question as to the necessity for carrying out remedial works to prevent crude sewage being discharged into rivers and estuaries to cause nuisance. However skilfully outfall works may be designed and carried out, after all the results depended on efficient management, and he felt that some supervision by an official inspector of outfalls would be an advantage. The question of the better conservation of the rainfall of the country was one of national concern, and yet it had not received the attention it required on the part of the Government. What was imperatively required was an authority having control over the whole of a watershed area and responsible to a State department. The Royal Commission on Sewage had indicated the desirability of forming river boards, and the President of the Local Government Board had raised the hope that he would bring before Parliament a Bill to deal with these matters. He thought a Royal Commission would facilitate matters by bringing into definite shape the lines which legislation shall follow.

The Chairman touched on the heavy rainfall of last year, one good result of which was that by preventing dust blowing about, and by cleansing the drains, sewers, and surroundings of houses, there was a reduction in the death-rate. The adoption of wood-paving and asphalte in the main thoroughfares, although attended with less noise, required, especially during dry weather, systematic cleansing with hose and water, and good scavenging. As bearing upon road sanitation the present method of preparing the surface of main roads left much to be desired, for the constant patching of the very uneven surfaces was serious. He was hopeful that in the near future the main roads would be covered in a way that would be smooth, durable, and as noiseless as any existing arrangement, and he had under observation forms of construction which warranted him taking that view. In conclusion he welcomed those attending the section, and expressed the earnest hope that the outcome of their deliberations would tend to advance the great object the Institute had in view in promoting sanitary knowledge.

Control of Water Supplies.

On behalf of Mr. J. R. Kaye, Dr. Johnstone gave the chief points of a paper on "The Supervisory Control of Water Supplies." The author pointed out that the legal duty of providing a water supply usually rests absolutely on the individual sanitary authorities, of which there are no less than 1,800 in England and Wales. Obviously a very large proportion of these authorities must look beyond their own area for the source of supply, and thus it had come about that in many parts of the country there has occurred something like a scramble for the best available supplies. There was now a wide and growing feeling that some form of supervisory control is absolutely necessary to apply to all future schemes if not to many of those already carried out. The author dealt with the many remedies which had been suggested, and said that whatever class of supervising authorities is created they must possess or be able to acquire complete and detailed local knowledge of the area under control, so as to be able carefully to weigh the interests of all parties concerned in the protection and allocation of the water supplies in that area; not merely taking cognisance of the contending authorities, but duly appreciating the rights of silent parties, and even giving a thought to those of the non-existant communities which the future may see. The supervising authorities must be large enough to take a broad and complete view of the situation, yet not too large to undertake the co-ordinating and supervising of the actual local or parochial control which is so badly-needed, especially in some of the following directions:—

1. To supervise the collection, storage, and distribution of water supplies, with power to inspect all works. To direct measures for the better husbanding of supplies where necessary, and to promote economy by suitable combination of districts. To see that there are no unauthorised departures from schemes as approved. To frame regulations for the protection of gathering grounds, and to enforce the exclusion of particular supplies where necessary. To approve of emergency measures in the case of scarcity or unforeseen eventualities.

2. To establish and carry on a regular system of comparative examination (physical, chemical and bacteriological) of all the public water supplies in their area, and thus gradually build up standards for each supply. Experience has shown, over and over again, that the significance of analytical data is relative and not absolute; that is to say, the early detection of slight mischief can best be made by comparison with previous regular records of the same supply.

3. To supervise all means for the corrective treatment of each supply, *e.g.*, storage, filtration, softening processes, chemical treatment for the prevention of plumbo-solvent action, etc. As things are at present these processes usually give excellent results when first established, but changes in staff or personnel of the water authority often induces corresponding changes in the efficiency of the treatment—or considerations of finance and local politics bring about laxity and irregularities of which the consumers of the water remain in blissful ignorance. The recent report of the Local Government Board on lead poisoning has clearly shown that this single phase of the supervision of water supplies is an urgent matter of no little magnitude, affecting both old and new supplies in many parts of the country, and having no connexion whatever with the function of a Rivers Board.

4. To keep a watchful eye on the health statistics of the various communities within the area, with a view to studying the influences of the water supplies upon health at all seasons. To investigate any disturbances observed, and apply remedies.

5. To group together areas for the purpose of distribution, and to secure water for them on equitable terms, and generally to represent their interests in obtaining adequate and permanent supplies, and preventing the depletion of their natural sources by outside districts.

6. To regulate, supervise, and enforce where necessary the supply and use of water for other than domestic purposes in the interests of the public health, *e.g.*, sewer flushing, road-watering, etc.

Dr. Barwise expressed the opinion that it was thoroughly absurd to suggest that Rivers Boards should be the supervising authorities over water supplies.

The Chairman moved, "That this meeting is of opinion that the whole question of water supplies demands investigation by a Royal Commission appointed specially to deal with the subject, and that representation be made to the Government accordingly."

The resolution was carried.

Domestic Sanitary Engineering.

Mr. Gilbert Thomson, M.A., Assoc.M.Inst.C.E., read a paper on "Domestic Sanitary Engineering in the West of Scotland." He referred to the unsatisfactory state of affairs when in 1883 he read a paper on "House Sanitation in and Around Glasgow," and said a vast change for the better had come about since then. The present position might be briefly described by saying that the standard arrangement of to-day is in its essentials very similar to the most advanced work of twenty-one years ago as regards design; that a first-class system of house drainage is now made of iron almost throughout; that the old notion of substantial and comfortable-looking woodwork has given place to the new one of impervious and non-absorbent construction; and that everything must now be done to the satisfaction of the sanitary inspector. In every new house, be it mansion, cottage, or tenement, and in every old one where suspicious circumstances have emerged, the drainage system is as a matter of course tested by smoke by the Sanitary Department. The question then arose whether the present methods are the best for securing good results now and satisfactory progress in the future, and his opinion was that they were not. The present standards of design, construction, and testing for the great majority of houses were simply those of the various building regulations. These regulations dated ten or twelve years back. Internal evidence suggested that their framers tried to ensure sound work and hoped they would get it, but had considerable doubts about it, and at that time probably their doubts were justified. Their tradesmen, however, had risen to the occasion and they

* Continued from last week.

now found no difficulty in getting work far better than could then be generally anticipated. On the other hand, the ordinary run of work could only just pass muster, and this was not because of any great economy thereby effected, but because their regulations and methods of inspection did not give any inducement to do better. He was satisfied that it would be possible to bring all work up to the standard which was now regularly attained in high-class work. He thought they should get rid of the grotesque notion that two classes of sewage, having their origin in the same apartment and their termination in the same drain, must travel by different routes. Any such change depended on the possibility of ensuring tightness, and that for all practical purposes could be attained by the simple means of effective testing. The author dealt with the smoke and water tests, and advocated the air test as being a simple and convenient means whereby it could be proved in a few minutes whether or not a drainage system was tight.

A vote of thanks was passed to the author of the paper.

Sanitary Fittings.

Mr. John Shanks, in the course of a paper on "Sanitary Fittings," said he would confine himself to those connected with the most economical and commonsense method of disposing of sewage—the water carriage system. In an ideal building all fittings and drains should be designed and arranged so that waste matter of every kind may be carried outside as quickly as possible, and the necessary rooms and appliances should be so placed against outer walls that they may receive the maximum amount of light and air. The following general laws should always be conformed to:—1. The material used should be impervious, and, wherever possible, pipes should be left uncovered. 2. The general construction should be such that the accumulation of dirt can everywhere be easily prevented. 3. The supply arrangements (taps, etc.) should be such as to do their work as quickly as possible. 4. Bath and lavatory discharge, overflow, and waste pipes, as well as traps and pipes leading therefrom, should always be from 1¼ in. to 2¼ in. in diameter, i.e., should be large enough to carry off the water with all supply pipes running full bore. The overflow pipes should be readily accessible and movable, so that they can be taken out for cleaning. The traps should be so placed that they can be easily fitted, removed, or examined; they should, wherever necessary, have large and properly contrived ventilating pipes (this prevents siphonage or noisy discharge); and they should be self-cleansing. The best material for their construction is cast brass, or cast-iron enamelled, which does not give way under the action of hot water and soap as lead does. The best material for supply and waste pipes is copper, or brass nickel-plated.

Drainage of a House.

Mr. Samuel Smith submitted a paper on "The Drainage of a House." The author stated that it was not intended in the paper to discuss the method of drainage but rather to consider the relative merits of cast-iron and earthenware pipes when used for underground drainage. Through inferior qualities of earthenware pipes being used, the results thereby being unsatisfactory, cast-iron pipes, in a great many cases, are now substituted for them. So long as cast-iron pipes can be kept free from corrosion they may be regarded as being satisfactory for drainage purposes. Corrosion, however, soon sets in, with the result that the velocity of flow of the sewage matter in the pipes is seriously impeded, and the efficiency of the drain is lost. Details were given by the author of a number of tests made on various preservatives of cast-iron pipes by a weak solution of sulphuric acid, in every case the preservative being affected. It might be argued that a system of house drainage was not required to stand the action of acids, and that these tests were no guide as to the suitability of cast-iron pipes connected with one of the preparations mentioned for the carrying away of soil and waste from dwelling-houses. He held, however, that a drain should be able to stand the action of any kind of liquid which might be poured into it. No objection on the point could be made against fireclay pipes of first quality. Details of tests made on fireclay pipes were next given, from which the author adduced the following conclusions:—(1) That a 6-in. layer of concrete round a pipe made the pipe sufficiently air-tight. (2) The liability to fracture through unequal settlement of the ground on which they are laid may be overcome by the laying of a bed or layer of concrete underneath the pipes. He recommended that with regard to the joints nothing but a slow-setting cement, thoroughly cooled and aerated, be used, and that it should be well staved into the joints so that all the air in the cement be forced out and a thoroughly air and water joint would be the result. With regard to cost, also, there was considerable economy in the use of fireclay pipes. In conclusion, he suggested that fireclay pipe-makers should test their pipes to say 60 lb. of hydraulic pressure, and sell their pipes with a guarantee that they will stand that test. If this were done the users of pipes, in the knowledge that they were getting a satisfactory article, would readily pay an additional 10 per cent. on the cost of them, and the result would be more satisfactory to all parties concerned. Improvements have been made in recent years on fireclay pipes, and further improvements could and would be made if makers saw that it was to their advantage to do so, through there being a demand for a superior article.

Defects in House Drains.

Mr. J. W. Pearson, C.E., dealing with the subject of "A Few Common Defects in House Drains," said defects dealt with in the paper were chiefly those arising from the adoption of manholes with open channels, and the use of earthenware pipes. The best manholes of this description could not, without elaborate precautions and great expense, be made to remain air-tight, and in any case their walls, bottoms, and channels become foul; they interfere with the effective ventilation of any system of drains upon which they are used; when deep they are huge receptacles for foul air, which is not removed by the ordinary drain ventilators; they are often the cause of stoppages; and where metal access covers are used at all, these are often so fixed, or in such a condition through neglect, as to form a ready outlet for the foul air contained. Although they may look very well and very convincing when new, they never satisfactorily stand the test of time. The advantage to be derived from a perfect drain is at once annulled by the existence of a manhole which in a short time becomes defective and allows foul air to escape, perhaps under a window or floor ventilator, or it may be direct into the house itself. By using closed access bends or junction pieces instead of open channel inverts in all manholes, not only is the volume of foul air greatly reduced but it is confined to the pipes, and the manholes become what they really ought to be, viz., a means of access to, but not an actual part of, the drains; and this without adding to their cost. Earthenware pipes which are wholly unfit for the purpose are often used, but even when they are, of their kind, satisfactory, many defects crop up in laying them, any ordinary labourer being considered fully qualified to carry out this part of the work. They are also liable to injury when filling in or beating down the trenches, and any slight settlement of a wall or building is sufficient to break the pipes or the joints, and even the natural consolidation of the trenches may do so. The great number of the joints adds to this risk, and it is seldom that one tests an earthenware system of house drains that has been down for a few years without revealing defects more or less serious. By the adoption of iron piping the majority of the defects common to earthenware become at least very improbable, but where the drains are of iron, all connected traps, etc., should be of iron also; a connexion between an earthenware gully and an iron pipe is seldom a satisfactory one. Glass enamel, though providing a very smooth interior surface to an iron pipe, is not always a safe preservative, as it is not proof against the action of acids, and as the latter are likely to be present in the sewage it should be avoided. Iron pipes should, however, always be treated with Smith's solution. In several towns earthenware drains are not allowed to be laid under any building, but if this were carried further, and neither open channel manholes nor drains of other than iron piping permitted within a certain defined distance of any house wall, most of the defects now met with would soon become things of the past.

In the course of a short discussion on the three foregoing papers, Dr. Scurfield (Sheffield) urged the necessity of a second test. This was put into the specification for work for the Manchester Corporation. By the second test it was discovered if the trenches had been carefully laid and whether the pipes were resting on their sockets. It also showed whether the cement used was good cement.

Mr. W. Parry said he had had twenty years' experience with fire-clay pipes, and he found that if they gave a second water test, and if the work was finished properly and no disturbance took place afterwards by building operations, it was perfectly easy to construct a fire-clay drain which would remain perfectly water-tight.

Mr. Saxon Snell thought that one way out of the difficulty was to require that a better class of labour should be employed. When iron pipes were laid the joint was made by a plumber who was a skilled man, but it was rarely that a builder employed anyone but a labourer to lay earthenware pipes. Another difficulty in laying earthenware drains was that of foundation. If they had a bad foundation it stood to reason that they could only lay iron pipes.

Mr. Smith, in reply, said his contention was that a drain should be laid so as to take any kind of sewage—not only domestic sewage, but any kind of liquid. If a man wanted to make chemical experiments at home his drains ought to be capable of carrying away his chemicals.

Mr. A. G. Wallis agreed that the second test was a good point. The only objection to cast-iron pipes was that they corroded outside, but if the trouble was taken to put gravel round them they would be saved from corrosion.

Distribution of Sewage on Filters.

A joint paper by Dr. Geo. Reid and Mr J. E. Willcox, Assoc.M.Inst.C.E., followed, on "The Importance of Uniform Distribution of Sewage on Filters."

Mr. J. E. Willcox described the experiments recently undertaken by his firm in connexion with Dr. Geo. Reid, the County Medical Officer of Health for Staffordshire, which are the first in which power-driven distributors had been used. The experiments were carried out at Hanley, where there was a population of 62,000, and were on a large scale, dealing with 500,000 gallons per day. Dr. Reid did all the analytical work in connexion therewith. The installation for the purpose of the experiments consisted of a small detritus chamber and an open septic tank of 500,000 gallons capacity, together with two large filters having a total area of half an acre. The travelling distributor consists of a carriage with wheels running on rails fixed on each side of the central trough and supporting a pipe in the form of a siphon, with trapped outlet, by means of which the sewage is drained over the side of the troughs into the distributing pipes. The apparatus travels backwards and forwards the whole length of the filter, and by means of a simple automatic valve arrangement each side is fed alternately to insure equal intervals of time between each discharge on to the bed. The power required for the quarter-acre filter is only 1·08 horse-power, and the actual cost of driving the distributor, including labour, is 2s. 5d. per day of twenty-four hours, the quantity of sewage dealt with during that period being 250,000 gallons. The experiments had been carried on continuously by night and day, with occasional stoppages for slight repairs, for a period of fifteen months; the volume of sewage dealt with was 100 gallons per super yard, which was gradually increased to 230 gallons, and it is intended to still further accelerate the flow. The intervals of time have been varied from four minutes to seven minutes, the best results from a given volume being obtained with the longer interval. The neighbourhood of the sewage works is thickly populated, but no nuisance has arisen from them. It should, however, be mentioned that the sewage is discharged only a few inches above the bed. No difficulty was experienced by reason of frosts during the cold weather last winter, including four nights when no less than sixteen degrees of frost was registered. The results of the experiments have been so satisfactory that the author's firm has been instructed to carry out a complete scheme for dealing with the sewage of the borough on the same lines, it being intended to adopt rectangular beds, and eighteen power-driven travelling distributors, each controlling half an acre filter-bed, and capable of dealing with some 12,000,000 gallons per day.

Dr. Geo. Reid said it was now pretty generally admitted by those who have been actively at work in endeavouring to solve the sewage disposal difficulty by artificial biological methods, that "filtration" is to be preferred

to "contact" as a means of effecting the final process of oxidation. In advising the Hanley Corporation to construct the experimental works they had three chief objects in view, viz., to determine (1) whether the sewage in question could be disposed of by treatment in resolving tanks, followed by simple filtration; (2) the area and depth of filter necessary in view of the highly efficient means of distribution provided; and (3) the size of filter particles which would give the best results. They had a pretty firm conviction that with perfect distribution single filtration through a depth of filter of about 4 ft. 6 in. would answer the purpose, and that this conviction was justified had been demonstrated by the results of about eighteen months' working. In the case of the circular filter a constant and regular flow of 200 gallons per superficial yard was maintained, while in the rectangular distributor, owing to a defect, the mean flow was 162 gallons. Each yard of filter received its quantum of sewage at seven minutes interval, as recommended by Mr. Scott-Moncrieff. The author gave the analyses of sewage and effluents dealt with, and said the conclusion to be drawn was that in every case the degree of purification which had been effected was excellent.

Dr. Fowler (Manchester) protested against Dr. Reid's sweeping assertion that filtration was to be preferred to contact. Seeing that more sewage was purified in England by the latter process the assertion would not stand. He noticed that the cost of the Hanley system was fairly large, being about 10s. 6d. per million gallons. If they could build and work contact beds at about 3s. 6d. per million gallons, it hardly seemed to him that it could be said that filtration was to be preferred to contact.

Professor Kenwood said that no doubt, as far as Hanley was concerned, the results were very good, but they had had to unlearn so much that they must not hold too dogmatic views with reference to the treatment of sewage. He did not doubt that, everything else being equal, sprinklers were better than contact beds. If they had purely domestic sewage rather weak, and had sufficient tankage to enable the solid matter to be dealt with efficiently, then no doubt the sprinkling bed was the thing to use; but, on the other hand, he had known cases where, owing to insufficient tankage accommodation, the sprinkling apparatus had to be discontinued on account of the smell, which became a nuisance.

Dr. Barwise said if they had sprinklers they must have a sufficient capacity of septic tank, but by having this they served a large area of other water-tight tankage in the contact-beds.

Mr. Martin (London) said that, in his own experience, he had produced results by single contact which were sufficiently good for the generality of purposes.

Mr. Willcox, replying to various points raised in the discussion, said the greater part of the Hanley district was separately treated. Mr. Martin had raised the important question of cost, and the reason for omitting the cost of the circular distributor was that the whole thing was an experiment. In actual experience, for instance, they found that a 3½-h.-p. engine was sufficient, whereas they had installed a 6-h.-p. engine. These and other matters made it an unfair thing to give the actual cost. Now the whole thing was carried on one outside rail, but in a new distributor they would put a centre and reduce the weight, and so be able to work at less horse-power and consequently reduce the cost. The same remarks applied to the rectangular filter. Notwithstanding, he did not consider that 10s. a million gallons was an excessive cost, considering that they got a uniformity of distribution and the absolute control which was required for the purpose of the experiment. A question was asked whether, in the event of the distributor passing more slowly over the beds, the suspended matter came away, and he could answer in the affirmative to that. The whole object of the experiment, however, was to get absolute uniformity, both as to volume and time.

Dr. Reid also replied, and said that if the mechanical distributor did cost more money to provide and work, yet, if they could show tnat, by reason of the more perfect methods of distribution, they could save a large area of filter and a considerable depth of filter, the matter of cost became a secondary matter. It simply became a question of laying out a little more capital expenditure.

This concluded the sitting of the section on Wednesday.

Portland Cement.

At the sitting of the Section on Thursday, Mr. E. R. Matthews opened the proceedings with a paper on "Portland Cement; the Need of a Standard Test." The author pointed out that never was there a time when cement was used so extensively as now, and it was most necessary that it should pass a standard test. At present the matter rests entirely with the engineer or architect, and what one considers a fairly stringent test another considers miserably weak. He pointed out the fallacy of the old idea of considering that cement that went over 450 lbs. on the sq. in. was over-limed, and therefore not satisfactory. He urged that a 28-days' test, as well as a 7-days' test, are necessary in order to determine the regular increase of strength with age, the latter taken alone (as is the usual custom), he maintained, is not a test at all; it is a complete fallacy to suppose that it is, and he most strongly recommended, as the most reliable test, a sand and cement test. Further, he maintained that a compression test is absolutely necessary, although seldom adopted, and pointed out how such a test may be made.

The Chairman said the paper was hardly one for discussion, as they were all agreed with the necessity of having a standard for cement.

Factory and Workshop Ventilation.

Mr. H. M. Robinson followed with a paper on "Ventilation in Factories and Workshops." He referred to the necessity for thorough ventilation, and said that natural ventilation depended so much upon the construction of the room and the condition and temperature of the air outside that it was impossible to lay down rules on the subject. Natural ventilation might be obtained by openings in the chimney near the ceiling or by shafts through the roof or outside walls. In the lower rooms of buildings of more than one story these shafts should be carried up through the roof if possible, or at least some little way up the outside walls. In sheds, or buildings of one story only, louvre openings in the roof afford a good means of ventilation. Whatever method was adopted, however, it was necessary that the position and size of the openings should be determined by a competent person, and that there should be an ample supply of them. It would probably be found advantageous, speaking roughly, to provide one medium-sized outlet for every five or six persons in the room. The author next dealt with artificial ventilation by means of fans. Satisfactory results could only be obtained, whether the natural or artificial system of ventilation be adopted, if both the inlets and the outlets for the air were of sufficient size and properly placed in each particular instance.

Mr. G. Thomson said the question had a public point of view with reference to the extraction of dust, etc. While it might be satisfactory to the owner to get rid of the dust by discharging it into the air, it might be a nuisance to those around.

Mr. Robinson said his suggestion was that in the room there should be a settling chamber, into which injurious dust could be blown by the fan.

School Ventilation.

Dr. A. Greenwood gave the results of his investigations into the sanitary conditions of 52 public elementary schools at Blackburn. He summarised his conclusions as follows: (1) Natural ventilation is easy to manage, subject to certain conditions, which I have named, and will be more efficient if the fullest advantage is taken of this means. (2) In some schools provided with mechanical ventilation frequent reliance is placed upon natural ventilation. (3) There is a diversity of opinion as to the value of the known systems of mechanical ventilation, and there is a need for further inquiry upon this subject.

Mr. W. Key (Glasgow) said he thought the proper thing would be mechanically to change the air by an apparatus absolutely independent of the vicissitudes of the weather. He advocated the system of plenum ventilation. He thought it was most important that the dust should be removed and that could only be done by the plenum system, which would carry away the emanations. He found from the discussion in technical journals that architects and others were quite able to criticise plans for an infirmary or hospital but did not themselves understand what the word plenum meant, and consequently the public had an idea that plenum ventilation was to be avoided.

Dr. Greenwood said he could not agree with Mr. Key, and could not recommend that mechanical ventilation should be applied wholesale so far as the Blackburn schools were concerned. He found in the two mechanically-ventilated schools they had at Blackburn the results were no better than those obtained in naturally ventilated schools.

Housing and the Public Health Acts.

Mr. G. D. Armstrong read a paper on "The Past, Present, and Future Conditions of Housing Under the Public Health Acts," in the course of which he referred to the evils arising from the loose manner in which the regulations and by-laws were carried out in many cases. The greatest part of the dwellings of the working-classes had been built by speculative and sometimes, perhaps often, jerry builders, whose ideas of sanitary and permanently healthy dwellings did not enter into the case of profits. He did not condemn on the whole the speculative builder—he had been a most important factor in helping to decrease the troubles of overcrowding. The first and one of the most important data bearing on the housing question was the legal definition of overcrowding. He suggested a minimum of 400 cub. ft. per adult for all rooms. All associated houses, and all houses let in lodgings, for the working classes should be registered if required by the medical officer. Dealing with Parts I., II, and III. of the Housing of the Working Classes Act, the author advocated what he described as the "localisation" of land outside the town by the local authority. This was the purchase of land not ripe for building, which could either be held in trust for the ratepayers or immediately developed. Rapid and cheap transit must accompany localisation schemes. Most municipal work cost 20 per cent. more than ordinary building, owing to the many useless restrictions which should be abolished.

Councillor Burgess (Glasgow) said in Glasgow they had 104,000 people living in one-apartment houses, with a diversity of 3½ persons per room. He contended that a local authority ought not to encourage and perpetuate one-apartment houses.

Dr. Honeyman (Glasgow) submitted that the great thing in the housing of the poor was to have cheap dwelling places. The death-rate was not due to the smallness of the houses but to the way the houses were occupied.

Dr. Sykes (London) criticised the idea of localising land in the way suggested, because if it was held it might become totally unsuitable for housing purposes. Of course, it might be said that the Corporation could sell the land, but that opened the path to municipal trading in land, and he did not think Parliament would allow that. He agreed that it was quite unnecessary to enforce the expensive construction required by the by-laws, and hoped they would be altered. They did not want to build houses to last 100 years, but they wanted cheap houses.

Mr. Munce (Belfast) said the question was not understood either in England or Scotland. They must build houses that a man could afford to live in. Local authorities, instead of selling land altogether, ought to let it for building purposes, and the houses should be built from the point of view of working people and not from the point of view of millionaires.

Mr. Campbell (London) remarked that the financial question was the crux of the whole matter, and they ought not to be compelled to pay the loan back in too short a time.

After further discussion, Dr. Sykes moved: "This Section recommends the Council of the Sanitary Institute to represent to the Local Government Boards of England and Scotland that the definition of overcrowding as 400 cub. ft. per adult person, and half the amount per child, in sleeping rooms is required in the interests of public health."

Mr. Armstrong seconded the resolution, and it was carried.

Cottages for Agricultural Labourers.

Miss Churton read a paper, prepared by Miss Constance Cochrane, on "Cottages for Agricultural Labourers." The writer held that the labourer's cottage should not be built with less than three bedrooms, as the two-bedroom cottage already furnishes by far the larger proportion of the existing supply, and is the unavoidable cause both of overcrowding, and of the herding together in the same room of persons of both sexes and of all ages. The two principal bedrooms should contain not less than 1,000 ft. of cubic capacity each; 300 cub. ft. of space

being the minimum health allowance for an adult or child over ten, and 150 for children under ten. There should also be a fireplace in at least one bedroom. There appears no sufficient reason why stairs should be inclosed between walls, instead of rising out of the kitchen or scullery. Two living-rooms are better than one, but one large room is very preferable to two small ones, and the scullery should be of a size which would make it impossible for the family to live in it. All the windows in the house, including one in the pantry, should be made to open, and should extend to the ceiling. The material used in building is less important, provided the soil is dry, the foundations good, and the walls rainproof, and with damp courses. And it would be well to encourage building with whatever material can be produced most cheaply in the neighbourhood; as is done, for instance, at Winterslow, near Salisbury, where a good detached cottage with three bedrooms can be built for 115*l.* out of the chalk of the country.

The Construction of Hospitals.

Mr. Alex. Cullen, F.R.I.B.A., then read a paper on "The Construction of Hospitals." The author said that he proposed to deal particularly with hospitals for the reception and treatment of cases of infectious disease, yet his remarks would, in a number of details, apply to hospitals of all kinds.

Proceeding, he said:—"Suppose, then, the sanitary authorities of a town of about 100,000 of a population have, after considerable pressure by the Local Government Board, resolved on the erection of a hospital for the treatment of cases of an infectious nature. The next question that comes to be considered is the number of beds for which provision should be made. It is customary to provide one bed for every thousand inhabitants within the area that the particular hospital has to serve. While this may be sufficient under ordinary circumstances, it is always well to provide accommodation on an ample scale. In order, therefore, to meet emergencies in times of exceptional epidemics, which are observed to occur at intervals of three, four, or five years, accommodation should be provided to the extent of three beds for every 2,000 of the population. In this particular case we shall assume that the hospital is to be planned on the higher standard and to accommodate 150 patients.

"In the site of a modern hospital for infectious diseases an area of one acre for every twenty beds is considered sufficient, but in the present instance we are dealing with a model town council, and they have the wisdom to foresee the possibilities of a future extension of the buildings, and decide on acquiring ten acres of land. This question of site is a very important one, and it is well that the medical officer should be consulted on the matter, who in all likelihood will direct his attention to its physical conditions, such as aspect, prospect, and inquire into the nature and extent of the sickness and the rate of mortality in the particular district. After satisfying himself on these points, the medical officer recommends a site. It is situated in the open country yet convenient to the district the hospital has to serve, so that patients have to be driven only a short distance. The ground slopes gently towards the south, and it is well sheltered by trees, both on the north and on the east sides. The soil is of a dry loamy nature, and is well under drained. The water level in the subsoil is fairly deep and permanent, and there are no objectionable conditions near that might lead to the pollution of the soil. There is an abundant supply of water for the needs of the hospital, and a good drainage outlet can be obtained. The cost to the land will depend to a considerable extent on the situation, but supposing there are exceptional circumstances to be taken into account a fair value would be from 250*l.* to 350*l.* per acre.

"The site having been fixed on, the next matter that comes under consideration is the nature and number of the diseases to be treated. On this question the medical officer will be guided by the statistics of the infectious diseases prevalent in the district more especially during epidemics. His experience also in the practical working of a hospital will indicate the extent of the administrative offices necessary for the effective management.

"Suppose, then, the following programme of classification with explanatory notes has been prepared:—Scarlet fever, 100 beds; enteric fever, 20 beds; diphtheria, 12 beds; measles, 10 beds; typhus fever, 8 beds. Total, 150 beds.

"The accommodation for cases of scarlet fever to consist of two observation or probationary wards of two beds each. In these wards will be received cases considered to be scarlet fever, but in which the diagnosis was doubtful. Here such cases will be detained until the nature of the illness has declared itself. The ordinary pavilions to provide for 72 beds divided into wards of 12 beds for females and young children and wards of six beds for male adults. Attached to each ward there is to be a one-bed ward intended for special cases or for private patients.

"*Isolation Block.*—Of two wards of four beds each for the isolation of cases of double infection, such as scarlet fever with diphtheria, scarlet fever with whooping cough, or scarlet fever with measles.

"*Discharge Block.*—Divided into two wards of four beds each. To this block would be sent the patients believed to be free from infection. Here they would receive special bathing, and be under careful observation for a few days prior to their discharge. These precautions are intended to avoid 'return cases'—that is, cases which occasionally occur in the households to which patients have returned from the hospital.

"*Enteric Fever.*—The accommodation for enteric fever patients to consist of two wards, one for twelve beds the other for six beds, and attached to each a one-bed separation ward.

"*Diphtheria.*—A block consisting of a general ward for eight beds, and four single-bed wards, besides a small room, well lighted from the roof, where operations may be conducted. In the one-bed wards are to be special steam connexions to provide a moist atmosphere for critical cases.

"*Measles.*—A block having a six and a four-bed ward intended for the isolation of cases occurring under circumstances involving special risk of the spread of the disease.

"*Typhus Fever.*—A block divided into two wards of four beds each. Although cases of typhus fever are not of frequent occurrence, still it is better to provide for an emergency. This block when not in use for its special purpose would be available as convalescent wards for enteric fever patients when that disease is prevalent.

"*Administrative Block.*—This building should be located about the centre of the group, and convenient to the entrance gate, so that anyone calling on business, or vans delivering stores, would not go near the wards where patients are being treated. Accommodation should be provided sufficient to cope with any emergency that may arise, and the possibility of a future extension should be kept in view. In a hospital for 150 patients there will likely be a staff consisting of a medical superintendent and an assistant, a matron, thirty-nine nurses, fifteen female servants, such as ward-maids, laundry-maids, kitchen servants, and housemaids; besides four male attendants. The ground-floor on one side of the block should be devoted to the medical officer, and the other side to the matron and nurses. On the first floor should be the sleeping accommodation for the matron and nurses, each nurse to have a separate room about 12 ft. by 9 ft. Ample bathrooms and lavatories should also be provided. Special precautions to be taken to have the rooms for the night nurses in an undisturbed wing of the building. The female servants to have their sleeping apartments on the second floor, but entered by a separate stair from that to the nurses' quarters. In the rear would be the kitchen department. The kitchen should be a large apartment well lighted from the roof and thoroughly ventilated. Attached to the kitchen are to be a wash-up scullery, a vegetable scullery, and a service room with a recess for food trolleys; besides the necessary stores and larders. The milk store should have an intervening lobby for scalding milk pans.

"*Laundry.*—The laundry to be removed as far as possible from the infected buildings with which it should have no connexion by covered ways. This block may with advantage be divided into two sections, one for male and the other for female labour. In the first section will be placed, perhaps in the basement, the steam boilers, coal store, fire pumps, engine room, workshop, destructor for destroying the hospital garbage, and a steam disinfector sufficiently large to receive bedding or other large articles. In the second section would be the wash-house and ironing room. The ironing may be common to the clothes of the staff and the patients, but there should be separate wash-houses for the soiled linen of the staff. The receiving and discharge rooms should also be separate. The drying chamber would be convenient if placed between the wash-house and ironing room, the hot air being driven into this chamber by a fan; and a fan will also be required for extracting the steam from the wash-house. As a laundry is the place in a hospital where infected articles are gathered, special precautions should be taken. The soiled articles from the wards should be placed in steeping tanks, and the tanks classified for the different diseases.

"*Entrance Lodge.*—This building to be placed near the entrance gate where the head male servant would reside, and his wife act as gate-keeper. Attached to the gate lodge there is to be a waiting room for friends of patients. The accommodation for the male servants to be on the upper floor of the lodge, but entered by a separate entrance. Between the entrance gate and the wards there should be a waiting room for ambulance nurses, and fitted up with a hot plate and shelves for blankets.

"*Mortuary.*—This building to consist of a mortuary and post-mortem room, a small laboratory, and a room for friends to view the body; the body, instead of being placed on a slab in the usual manner, will be laid on a bed, and the bed can be wheeled into the viewing room.

"In the compiling of the programme I assume that the medical officer has been associated with the architect, and the architect will be wise if he continues this association until the general principles of the scheme are fully matured; after which the medical officer will be wise to leave the carrying out of the details to the practical architect. The architect in preparing the plans keeps closely to the programme of classification, and connected therewith the first point to receive this attention is the ward; for the form of a ward governs to a considerable extent the planning of a hospital. It may be taken as an axiom that where land space permits the wards are better if contained only on one floor; the pavilions are, therefore, planned one story in height. The distribution of the several buildings on the site is a matter of the utmost importance, in order that each ward may obtain the fullest amount of sunshine. The longitudinal axes of the several blocks are, therefore, placed north and south on the site, or, perhaps, a few degrees east of south and west of north. By this arrangement sunshine on three sides of the wards can be obtained. The plans are based on this principle, with the result that the wards are arranged on parallel lines, as shown on the block plan to which I wish to direct your attention. The space between the pavilions is 40 ft., and there is a zone of 50 ft. between the buildings occupied by infected persons or things and the hospital boundary. The communication between the several parts of the hospital is direct, and for the comfort of the staff the paths are roofed over but open at the sides.

"The floor area and cubic space of a ward have to be regulated to a considerable extent by a standard set up by the Local Government Board. The area is given at 144 sq. ft., and the cubic space at 2,000 ft. per patient. These units, however, need not be strictly applied in every case. For instance, is it not reasonable to suppose that the cubic space in an acute ward should be more than in a convalescent ward? Besides, medical authorities recommend that in cases of enteric fever and diphtheria the standard should be increased. The width of a ward will regulate the other dimensions, but it should be noted that floor area is of more value than additional height of ceiling. An ample width should be allowed for tables and fire stoves in the centre of the ward, and also to permit of the bed being kept about one foot from the wall.

"Taking all these points into consideration, it seems that 26 ft. is a suitable width and 13 ft. a convenient height for a ward. The width and the height having been fixed, the only question that now remains is the distance between the beds, and this distance will determine the cubic capacity of the ward. In the plans under consideration there is provided 12 ft. of wall space per bed for the scarlet fever convalescent wards, while in the scarlet fever acute wards and in the wards for diphtheria and enteric fever the distance is 13 ft. The cubic space in the one instance is 2,028 ft., and in the other 2,197 ft.

"The window space in a ward will be governed

by the floor area and cubic contents. Experience has shown that in this country one square foot of glass is required for every 60 cub. ft. of space, but where verandahs overhang windows, or where wards are lighted only from one side, the glass area should be increased.

"The bathroom is at the entrance end of the ward and is provided with two baths, one of the usual size of 6 ft. and a smaller one for children. The baths will be rapidly filled and emptied The sanitary appliances are placed in a turret at one of the distant angles of the ward, and are separate therefrom by a well-lighted and ventilated lobby. Here will be two water-closets and a sink room. In this room will be fitted up a combined arrangement of sinks divided into three sections:—the first consisting of a grooved slope about 3 ft. 6 in. long for the cleansing of macintosh sheets, the second of a scalding sink for washing urine bottles, and the third a sink for flushing bed-pans, and which will serve also as a slop sink. In the sink-room there is also a small cupboard for the retention of bed-pans that have to be examined by the doctor. At the other angle of the ward facing the south-east is a sun-room, which is divided from the ward by folding doors, so that patients unable to leave their beds can be wheeled into the room. Between the two angle turrets is a verandah for the use of patients who are able to move about. The one-bed ward is near the entrance, and has its own sanitary conveniences.

"The ward kitchen is placed between the two wards, and has an inspection window into each. In this room will be a small fire range or steam closet for keeping food warm; besides a wash-up sink and a dresser. Near the ward kitchen is a nurses' toilet-room and water-closet, a linen store and a milk larder.

"Having given a general description of the plans, let me now direct your attention to the construction, finish, and equipment of the hospital. The essential requirements are ample light and ventilation, no sharp angles or mouldings to catch dust, the wall surface and floors of a hard, non-absorbent nature, also as little woodwork as possible; the whole so planned and constructed as to require a minimum of care or repairs. The method of construction and finish of the plans now shown is intended to accomplish this result.

"The foundations will be of Portland cement concrete, and the damp-proof course of Caithness pavement 2 in. thick. The area under all floors will be covered with a layer of asphalte. The walls will be built of brick 16 in. thick, consisting of a 9-in. outer face, a 2½-in. hollow space, and a 4½-in. inner facing tied together with galvanised iron straps. The ward floors will be of teak wood, and the surface shellacked and wax polished. The skirting will be of the same materials as the floor, and hollowed or coved to a 3-in. radius. The corridors and sanitary turrets will be paved with marble terazzo, while the bath-rooms will be paved with indiarubber interlocking tiles. The windows in the wards will have the lower part hung as an ordinary window and the top hinged to open inwards. There will be no other projections to harbour dust, and all the facings will be rounded and keyed to the plaster. The glazing will be of polished plate-glass, as this is preferable to double glazing with sheet-glass, for in course of time the space gets filled with dust. The doors will have flush panels and the plainest of furniture. The standards on which the doors are hung will be checked for the doors and the wall plaster, so that no cheeks or facings will be required. The plumbing will be executed on the most approved principle. The pipes and fittings will be exposed, and all traps will be ventilated to the roof. The walls of bath-rooms, sanitary turrets, and corridors will be lined to a height of 5 ft. with white enamelled tiles. The buildings will be lighted by electricity, and there will be telephonic communication through the several blocks.

"*Heating and Ventilation.*—The boilers for raising steam will be placed in the laundry block, the steam being conveyed in subways to a central point in each block. The steam will be led into calorifiers, of which there will be two—one for the supply of hot water to baths and sinks, and the other for the heating system. Between the beds will be hot-water radiators, with high legs and baffle plates on front and fitted with a ventilating register, through which the fresh air will be introduced. The radiators will be fitted with valves so that the temperature in each ward can be regulated. The heating power will be sufficient to maintain a uniform temperature of 62° in the wards and 57° in the passage. In addition to the hot-water radiators there will be open fires. The foul air will be extracted by special flues in the walls and by shafts from the ceilings, terminating at the ridge with air-pump ventilators. Each outlet will be fitted with a regulating valve. . . ."

Mr. Campbell (London) said the arrangements shown on the plans were good. He liked the arrangements with regard to the sun-room and the verandahs. He would like to know what Mr. Cullen would estimate to be the cost per bed of the building shown on the plans, because he knew that the cost in hospitals had been run up to as much as 750*l.* per bed, and then they were prohibitive. He thought the discharge block was in too close proximity to the general infected area.

Mr. R. Lambie (Lanarkshire) said that Mr. Cullen had put up the Middle Ward Hospital at Motherwell, and he believed it stood unique in that country. It was one of the cheapest and best in the kingdom.

Mr. Wallis read a letter from Mr. Saxon Snell, who was unable to be present, in which he asked the following questions:—"Mr. Cullen advises the provision of the sinks in conjunction with the patent water-closets. I think the more modern practice is to keep them in a separate compartment with separate entrances from the ward. I have not had the advantage of seeing the plan of the ward referred to, but if, as I suppose, the sun-room is of the same area as the sanitary annexe, it will be rather small. The whole end of the ward, of a depth of 12 ft. to 15 ft. and with both angles canted, would provide a much larger and better-lighted room. Mr. Cullen suggests ordinary sash window with hoppers at the top. It is the usual practice, but we may hope that in the near future some better form of window with fewer internal angles and grooves may be adopted. It would be quite possible to construct windows with the glass flush with the sash or casement frames. My personal preference is for casements carried down to within a foot of the floor. Doors can now be made absolutely flush both sides and veneered with wide hard wood. Referring to the heating arrangements, modern hospital practice rather beyond the use of calorifics of each separate block. It is possible and much better to carry the pipes for one central station. One is always surprised to hear separate radiators with all their dust collecting properties advocated for wards. A couple of 2-in. pipes carried along the walls is a much simpler arrangement. The valves can be kept outside the wards. Ward furniture can no doubt be shod with wood, but indiarubber is better."

Mr. Cullen, in reply, said he saw nothing objectionable in the discharge block being near the other wards, because it was part of the hospital. It was entirely disconnected with the other buildings. He saw nothing to prevent a hospital of the kind described at a cost of 450*l.* to 500*l.* a bed. The cost of the Motherwell Hospital was about 400*l.* a bed. He appreciated Mr. Snell's criticism, but Mr. Snell was speaking of an entirely different type of hospital. Mr. Snell was speaking of a hospital for a city, but this one was for the country. He thought it proper to put the sinks in the same annexe as the water-closets. Mr. Snell thought it was the usual form of annexe with straight lines, but he proposed that it should be circular. If the sun-room was made larger it would take away the sun from the wards, and it was better to have a little sun than none at all. As to the windows there were no angles or grooves—everything was rounded and flush. It was objectionable to have pipes or radiators of any kind, but of the two he thought it better to have perpendicular lines of radiators than horizontal lines of pipes.

This concluded the sittings of the section.

Standards of Purity for Sewage Effluents.

On Friday there was a joint discussion by the Engineering and Architecture and the Physics, Chemistry and Biology sections. Professor Clowes presided.

Professor Dunbar (Hamburg) opened the sitting with a paper on "Standards of Purity for Sewage Effluent." The author stated that after many years of fruitless search it was believed they had at last found means to ensure thorough purifications of town and trade sewage, even in such cases were approved methods, as irrigaton or intermittent filtration, are not applicable. What was to be aimed at was that the water of our public watercourses does not become turbid, discoloured and foul, and that such water sustains fish life. It would be a mistake to search for a reaction that would enable them in one and all cases to affirm whether a certain sewage or effluent is fit to be discharged into the river or not. Such a reaction indicating whether the effluents are sufficently free from albuminous substances, or from certain products formed in the decomposition of proteids, could come in question in such case only where a thorough purification of sewage seems necessary. He did not intend to formulate definite propositions as to how many standards or classes of requirements would seem necessary, and which requirements ought to be made for the different standards or classes. He limited himself to the discussion of one question of fundamental importance, namely—"Does what we know of sewage analysis to-day put us in a postion to judge from the results of chemical investigation, whether a certain sewage or effluent tends to undergo putrefaction or not?" He proceeded to give the results of various analyses, and said that it was beyond doubt that they were, by using the absolute figures obtained by the methods known to-day, not always in a position to know whether a crude sewage or effluent will putrify, or will under given conditions create a nuisance in a river. The author summed-up his conclusion as follows:—The absolute figures obtained even by the best methods of determining putrescible matter in sewage do not in all cases give definite indications as to the putrescibility of any given sample. Effluents of purification works may present a most satisfactory character, and yet under certain circumstances contain as large or even larger quantities of either organic carbon, organic nitrogen, and albuminoid ammonia; as high an oxygen absorption, and loss of ignition as other samples of crude sewage which are in a high degree liable to undergo putrefaction. We should, therefore, give up the attempt to find a standard of general applicability based on absolute figures. A far safer judgment as to the putrescibility of effluents can be obtained by calculating the percentage of purification effected. Simple methods like Kubel's oxygen absorption test give results entirely sufficient for wants of practice, if used only for calculating the percentage of reduction. The analytical determinations spoken of are not needed in all cases. The requirement, that all effluents shoud be absolutely non-putrescible needs only to be made where the river presents most unfavourable conditions, or where the river districts are densely populated. In many cases it will be sufficient to require only that all coarser suspended matter be removed from the sewage. In other instances all suspended matter, including finer particles, should be removed as efficiently as possible. In other cases, again, the authorities will have to insist not only on the removal of the entire suspended matter, but also on a reduction of between 40 and 50 per cent. of oxygen absorbed by the dissolved impurities, the determination being made after filtering the samples; and there will certainly be such cases, too, where it must be stipulated that the effluents are limpid and entirely non-putrescible. It would be desirable that leading men in Britain and Germany where the great questions of rivers pollution and sewage purification are at present being discussed more than ever before, should come to an understanding to carry out the examination of sewage on the same lines. In such case the large amount of analytical work carried out in both countries every day, would lead to comparable results, and progress might be accelerated by mutual labour and interchange of ideas.

Mr. Ross (Burnley) said the authorities were composed of business men, and he felt it might be left to them, in conjunction with the chemist, to say what the standards should be.

Dr. McVail (Stirling) remarked that the whole question was whether the effluent discharged into the rivers would putrefy or not. He felt that they could say now that sewage treatment was one of the solved problems of sanitation. What was wanted was not a particular chemical composition, but that the sewage should not undergo putrefaction and not be disastrous to fish life.

Dr. Barwise (Derbyshire) observed that some of the samples of effluent submitted by Professor Dunbar would not be satisfactory in his county, where certain of their rivers were a source of income to the districts through which they ran.

Dr. McLean Wilson (Wakefield) said in his district they did not fix standards. An important point to be borne in mind was the

size and flow of the stream into which the effluent was discharged.

Mr. Archibald (London) said that the question of putrefaction must be determined not only by the actual state of the sewage effluent, but by the amount of water with which it was discharged.

A hearty vote of thanks was passed to Professor Dunbar for his paper.

Septic Tank System of Sewage Disposal.

Mr. W. Shanks described the results obtained at the Barrhead Sewage Works, where the septic tank system was in operation, and which had been designed to serve a population of 10,000 with a maximum sewage flow of 400,000 gallons per day. He gave details of cost, and stated that, after the capital was repaid, sewage would be purified at something like ½d. per *l.* rate per annum. The present sewage rate is 10d., but less than one-third of this is applicable to purification works. The analyses given showed the satisfactory nature of the purification and the continued efficiency of the works. The municipal council was perfectly satisfied with the purification.

Manchester Sewage.

Dr. Gilbert J. Fowler read a paper on "Recent Experiences in the Treatment of Manchester Sewage." He described the present state of the works, and said that at present two-thirds of the whole of the sewage of Manchester, including storm water, was purified at any rate to the point of being rendered non-putrefactive. Eleven more acres of contact beds would be at work by the end of the year. He referred to the characteristics of Manchester sewage, and gave tables with details of the sludge removed from the open septic tanks. The total volume of sewage filtered by the various beds during the year had amounted to 5,654,872,456 gallons, or 43 per cent. of the total quantity of sewage received at the works. The cost worked out at 3s. 8·6d. per 1,000,000 gallons actually filtered. Dr. Fowler dealt at some length with a table giving comparative data re filtration of tank effluent, which comprised results obtained at Manchester, Accrington, Burnley, Oldham, and Birmingham. The following were some of the conclusions which appeared to him to be justified by the table:—(1) That it is not possible to say on merely general grounds that one process is to be preferred to another, equally good results being obtained by a number of methods if carried far enough. (2) That percolating filters are more expensive than contact beds in first cost. (3) That whether they justify this extra first cost depends on local conditions. (4) That where pumping would be necessary in order to operate sprinkling filters, as at Burnley, Manchester, and Oldham, then contact beds are cheaper. (5) That where a sufficient area of contact beds can be obtained at a low cost of construction as at Oldham, they are cheaper under all circumstances. (6) That, for purposes of comparison, costs should be calculated on the dry weather flow. (7) That, other things being equal, a small flow per head conduces to economical treatment.

Replying to various points raised in the discussion which followed the reading of the paper, Dr. Fowler said he was not a partisan of any system. To him it was indifferent how sewage was purified so long as it was purified, and done at the least possible cost. He thought they must consider the special circumstances relating to each case. He was interested to hear of cheaply-constructed continuous filters, and if they could be put down at a satisfactory price by all means put them down, but he did ask them to consider the whole thing from one end to the other before coming to a conclusion.

Sewage Disposal on Chalk Soils.

Lt.-Col. A. M. Davies, R.A.M.C., with Mr. W. C. Tyndale, submitted a paper on "Sewage Disposal on Chalk Soils." Tests were made on the site of some barracks on Salisbury Plain, near Amesbury. The sewage from 1,377 men and 523 horses was brought to the land in a crude state, and applied to it directly, and this went on for about two years. The conclusions derived from the experiments made were:—(1) That, in the case of a chalk formation, there is practically no lateral movement of fluid falling on or spread over the surface, but that the moisture passes vertically downward. (2) That, so far as our observations extend, the soakage consists of saturation only, and that in the upper portion of the chalk the liquid forms no defined lines of percolation, resulting in trickles even where the surface is deluged. (3) That, when the surface is deluged, traces of sewage, as evidenced by bacteria, may penetrate to a considerable depth, but that when sewage is applied in an ordinary and reasonable way over the surface, no such contamination of the subsoil takes place.

Pollution of Rivers by Sludging of Mill Dams.

Mr. A. F. Somerville, Chairman of the Sanitary Committee of the Somerset County Council, in a paper on this subject, said the question was one which is practically outside the question of pollution of rivers by sewers or manufacturers' waste, and arises from the obstruction to the flow of water by the interposition of a weir or mill dam. The law on the subject is at present very unsatisfactory and conflicting, and the author instanced a number of cases which had been decided where the decisions were conflicting. He suggested that the special attention of the Royal Commission, which is now dealing with the prevention of pollution of rivers, be directed to it, and that they be asked to introduce further legislation with a view to the removal of a grave injustice to private individuals, an injury to the public, and a possible danger to water supplies.

SECTION III.—PHYSICS, CHEMISTRY, AND BIOLOGY.

This section held its first sitting on Thursday, under the Chairmanship of Professor Frank Clowes.

In his opening address the Chairman said the subjects which were brought together under this section were naturally associated. Chemistry, Physics, and Biology, not only constitute an ample field, but provide a conjoint area, the dividing boundaries of which are indefinite or non-existent, and over which each of us must more or less frequently have cause to travel. It is commonly considered that there is no very satisfactory delimitation of the field of the chemistry as compared with that of the physics, and it is quite certain that the biologist must concern himself largely with matters both chemical and physical. In respect of sanitary processes, it is indeed constantly found that one and the same purpose may be accomplished by chemical, physical, or biological methods. Perhaps no better instance of the alliance of these sciences can be given than in their application to the methods of sewage disposal. At one time the treatment of sewage by chemical processes was almost universally recommended, and discussion mainly turned on what chemical substances were the most efficient in rendering sewage inoffensive; then electrolytic treatment appeared upon the scene; and at the present time the discussion mainly turns upon the various means of applying biological treatment. The resolving action of organisms, which are excessively minute and are ranged at the bottom of the scale, appears to be likely to supplant the attempted purification of sewage by chemical precipitation and the more costly process of electrolysis. It appears now to be generally conceded that some method of controlled biological treatment will be the generally accepted means of rendering sewage inoffensive and of providing for its disposal. Professor Clowes proceeded to urge on the members the importance of purity of food and air. The increasing use of coal gas, petroleum, and electricity, for heating and motor purposes, was advantageously reducing the sources of atmospheric pollution, but the results thus far attained were very far from securing a satisfactory condition of the atmosphere.

Professor Gerald Henderson (Glasgow), in proposing a vote of thanks to Professor Clowes, remarked that, in view of the fact that the Glasgow authorities were committed to the precipitation method of sewage treatment, it was interesting to find such an authority as the Chairman stating, without hesitation, that the bacterial treatment was the right one.

Purification of Brewery Refuse.

Dr. H. Maclean Wilson read a paper on "Some Experiments in the Purification of Brewery Refuse." The results of the experiments undertaken at Rotherham showed that, although brewery refuse is more refractory than domestic sewage, it is quite practicable to purify it by ordinary bacterial means, aided by a preliminary treatment with lime. Taking the average results from the table of analyses, the precipitation with lime produces a tank effluent in which, as compared with the crude refuse, the suspended solids have been reduced from 24·8 to 13 parts per 100,000, and the albuminoid ammonia from 3·8 to 1·8, while the oxygen absorbed figure is increased to 32·7; it produces, moreover, a liquid which no longer has an acid reaction, although in such a condition that the acidity soon returns. The alkalinity, however, persists long enough to permit of bacterial purification taking place. The double contact treatment of this neutral or alkaline tank effluent further reduces the albuminoid ammonia from 1·8 to 0·7, and brings the oxygen absorbed figure from 32·7 to 7·9—quantities which are still much too high to be satisfactory. The percolating filter fed with the effluent from the contact beds produces an effluent which, when strained through sand, may be considered very satisfactory, the albuminoid ammonia being reduced to 0·15 parts per 100,000, the oxygen absorbed to 1·8, while nitrates have made their appearance, and the earth filter yields nearly the same result. The purification thus effected by chemical precipitation, double contact, percolation, and sand straining, when judged by the amount of albuminoid ammonia, amounts to some 96 per cent., and when reckoned on the oxygen absorbed figure to some 93 per cent. The course taken by the experiments was to a great extent determined by the nature of the existing works. In constructing works anew for the purification of such refuse, the best course to take would probably be to provide tanks for chemical treatment, a first percolating filter, and another at lower level, and finally a shallow strainer of sand for the removal of suspended matters. The tanks should not be too large, for fear of inducing acid fermentation in their contents, and the filters should be of sufficient area to allow of only a moderate quantity per yard being passed through them. With such an apparatus there should be no difficulty in producing an effluent quite fit to be discharged to a stream.

Other papers were read by Dr. S. Rideal on "The Hygienic Signification of Sulphur in Coal Gas," and a joint paper by Dr. Rideal and Dr. E. Baines on "The Suggested Use of Copper Drinking Vessels as a Prophylactic Against Water-borne Typhoid."

Conference of Sanitary Inspectors.

A Conference of Sanitary Inspectors was held under the chairmanship of Mr. T. F. Strutt, late chief sanitary inspector of the City of Westminster.

The Chairman devoted his opening address to the question of the insecurity of tenure of office of sanitary inspectors. He premised that his remarks did not apply to their brethren north of the Tweed, as he understood they had some security. He went on to show that if the public knew how oppressive their grievances were, and how they hindered their effectiveness, they would not any longer suffer under the present unjust conditions, which he regarded as a menace to public health. How could a sanitary inspector, he asked, be expected to do his duty fearlessly when the Council which employed him was, as was commonly the case, composed of slum property owners, house farmers, jerry builders, and their friends. What he proposed was that the sanitary inspector should have fixity of tenure in his office, with the right of appeal to the Local Government Board, and, if possible, superannuation. In conclusion, he advocated the establishment of a Ministry of Public Health, but he did not want one fashioned upon political lines, governed by a party ignorant of practical public health problems and science. In the absence of a Government Department, he testified to the value of the work of the Sanitary Institute.

Mr. J. H. Clarke, in the first paper, said that a new Public Health Act, embracing the Public Health Acts Amendment Act, 1890; the Housing of the Working Classes Acts; the Factory and Workshop Act; the Public Health (Water) Act; and the Infectious Diseases Acts, with certain readjustments and additional provisions, was a much-needed legislative reform, the need for which was becoming more and more urgent as the statutes accumulate.

In a paper on "Rights and Responsibilities in Relation to Sanitary Administration," Mr W. W. Kelso said that nothing strikes deeper at the root of the great social and housing problems than the need for a greater measure of supervision over houses and property, and of

interest in and intercourse with the occupiers. This would play no mean part in the great and much-desired national reform in social and housing conditions. Were the conditions not about ripe for a voluntary system of social reform on the lines of the Elberfeld or Leipzic systems ?

Other papers read at the Conference were: "Some Notes on Rural Inspecting," by Mr. T. Brice Phillips, and "What the People Sleep on," by Mr. P. Fyfe.

Mr. Anderson (Middlesbrough) moved that the Conference again adopt a resolution expressing regret that the Council of the Sanitary Institute had not seen fit to appoint one or more sanitary inspectors as members of the Board, and asking them to reconsider their decision.

The resolution was adopted.

Sanitary Science and Preventative Medicine.

At the Wednesday sitting of this section papers were submitted by Sir R. Temple on "Some Administrative Measures Taken Against Malaria and Consumption in the Tropics," and by Dr. Wright on "The Sanitary Condition of the Mercantile Marine."

In the afternoon there was a joint discussion with the section on Physics, Chemistry and Biology on "Shell-Fish and Enteric Fever," which excited much interest and a great deal of discussion. The paper leading up to the discussion was by Dr. A. Newsholme, medical officer of health of Brighton, who dealt with the cases of enteric fever and diarrhœa which appeared to be due to the oysters obtained from polluted layings at Southwick.

Dr. R. M. Buchanan, bacteriologist to the Glasgow Corporation, gave the results of his investigations into an outbreak of enteric fever amongst holiday-makers visiting a small watering-place on the west coast of Scotland. The outbreak was undoubtedly due to the visitors eating shell-fish taken from the foreshore polluted by the sewage of the town. The investigation proved that shell-fish at a distance of one to two miles from the sewer outfall were entirely free from evidence of contamination.

Conference on Hygiene.

On Thursday the Duchess of Montrose presided over a Conference of Women on Hygiene. Miss C. Cochrane, in a paper, strongly urged educated women with leisure to serve on rural councils, where, living in the country, they would naturally be conversant of the needs of cottagers as to water and milk supplies, housing, sanitation, etc., and would be able to furnish their councils with accurate information and suggestions.

The Conference sat again on Friday, under the chairmanship of Mr. Councillor J. Steele, when papers dealing principally with the conditions attending the employment of women were read.

Veterinary Inspectors.

Professor J. M'Call presided on Friday over a Conference of Veterinary Inspectors.

In a paper on "Public Abattoirs," Mr. L. M. Douglas pointed out that the construction of public abattoirs in the United Kingdom was in a very backward state, and few had been constructed on modern lines, so far as plant was concerned. The strongest argument for public abattoirs lay in the fact that efficient inspection was possible with them.

Hygiene of School Life.

On Wednesday a Conference was held, under the chairmanship of Professor John Edgar, on the "Hygiene of School Life." Amongst the papers read was one by Miss E. M. Evans on "The Responsibilities of Municipal Authorities and County Councils with Regard to the

Development of School Sanitation.

The author insisted that the condition of the schools, their sufficient ventilation, the proper sanitary accommodation, provision of playgrounds, well-aired cloak-rooms, and a good supply of drinking water afford much ground for discussion and organisation. She suggested that the responsibility of these things should rest on the medical officer of health.

Dr. T. Wood, in a paper on "A Plea for Co-ordination of the Public Health of Schools," said he regarded the rules laid down in the Code by the Education Department as to air space for children in schools insufficient. He suggested that each child should be provided with at least 200 cub. ft. of air space and 15 sq. ft. of area. It was on the report of H.M. Inspector that the Education Authority acted so that after schools had been built the inspector became the authority in connexion with heating, ventilation, overcrowding, and all matters relating to the general hygiene of the schools for scholars. He contended that the inspector could not possibly be regarded as an expert in such matters, and advocated that all matters connected with the public health of schools should be removed from the control of the Education Department and School Board, and conducted under one authority.

The Conference sat again on Thursday.

School Furniture.

Mr. J. Graham gave some particulars of adjustable school furniture first seen in continental schools. He said the present was an opportune time for all interested in the well-being of growing children and adult students to direct attention to the crying necessity for a hygienic revolution in the school furniture of our country. They wanted desks which would readily accommodate themselves to children's bodies, and seats to provide comfortable support where it was needed. In almost all schools the bodies of scholars had had to accommodate themselves to fixed seats and benches, and many evils had arisen from the system. "Hygienic" desks and seats reverse the old order of things, inasmuch as they accommodate themselves to the bodies, backs, legs, and eyes of the users. They provide, in addition, the natural angle required for reading, writing, and drawing, and the height of desk suited to the length of the scholar's body. In short, "hygienic" desks and seats should be so designed as to lead each person almost unconsciously to assume a natural and hygienic position, and supports for the left arm should be provided in the case of very young children, where necessary, in order that the correct position may be maintained with the minimum of strain.

The collection of *pupitres hygieniques* to which he directed attention have neither the key, the screw, the crank, nor the pinion movement, and have been designed in accordance with hygienic principles. He met with them while touring around Continental schools some two years ago, when they struck him as being a great advance on anything he had previously seen. They were invented by M. Manchain, of Geneva, and had been adopted as official patterns by the Swiss Government. Specimens of the desks were imported by the West Riding County Council, and since then, under the direction and guidance of Miss Alice Ravenhill, the firm of Illingworth, Ingham, and Co., of Leeds, have been making experiments with a view to improving the desks, and to producing seats which may be as satisfactory as is the movement of the desks—that is to say, they were in search of a series of desks and seats for elementary, secondary, and technical school purposes which are readily adjustable for the use of children and adults. The author described in detail a number of the desks, and said that some excellent features which may be claimed for these "hygienic" desks are that (1) they relieve the strain on the eyes, (2) they minimise the strain on the spine, (3) they enable the lungs to have a freer play, (4) they provide facilities for change of position for successive lessons, inasmuch as the scholars may work alternately sitting and standing, and (5) where adult evening work is carried on in elementary and secondary schools, men and women of from 20 to 30 and upwards have not to be squeezed into a low fixed desk built for children, but may get a desk of a suitable height.

Dr. Thomas Wood also read a paper on the "Great Importance of Hygienic School Desks and Seats," and said that the vast proportion of scholars attending school were compelled to sit at desks which caused them to assume postures which had a tendency to produce curvature of the spine and other bad effects.

Closing Sitting.

At the closing sitting of the Congress on Friday, under the chairmanship of Mr. Whitaker, Mr. White Wallis reported that between 1,500 and 1,600 members had been present at Congress. For the first time the Council had invited ladies, and fifty-one had attended.

The recording secretaries of the various sections handed in their reports, and votes of thanks were passed to the Corporation of Glasgow and other bodies for the hospitality offered.

THE ARCHITECTURAL ASSOCIATION.

THE following is the list of papers to be read at the Ordinary General Meetings of the Architectural Association during Session 1904-5:—

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April 7.—Subject to be announced, Mr. H. Phillips Fletcher, lecturer.

The meetings will be held at 7.30 p.m. on the Fridays stated, at No. 18, Tufton Street, Westminster, S.W.

The A.A. Scholarship, value 5*l.* 5*s.*, has been awarded to Mr. C. E. Hanscomb, and the Andrew Oliver prize as follows:—W. A. Hodges (3*l.* 3*s.*), F. T. Bush (2*l.* 2*s.*), P. K. Kipps (hon. mention).

In the studio, the Travelling Studentship (15*l.*) has been awarded to Mr. J. H. Markham.

Arrangements are now completed for the annual excursion, and the headquarters will be at the Digby Hotel, Sherborne.

Among the places to be visited, the following may be mentioned:—Trent, Sandford Orcas, North Cadbury, Beaminster, Melplash, Parsham, Crewkerne, Clifton Maybank, Brympton, Newton Surmaville, Milton Abbey, Piddletown, Waterson, Yeovil, Tintinhull, Montacute, and Preston Grange.

Illustrations.

JUMIÈGES.

THE view of Jumièges Abbey is taken from the north-east of the nave. On the right is the north aisle, which, like the upper aisle seen above it, is groined; on the left is the south side of the nave, which was not vaulted. The south aisle has fallen. On the south side are two roofing-shafts, which probably carried gabled transverse arches, the spring of one of which remains, over the nave. The roofing-shafts seem to have been reconstructed in Gothic days, and are now in part of plaster. Above is a glimpse of the south-western tower. The Abbey has hitherto been in private hands, and photography and sketching have been prohibited. Lately, however, it has become an historic monument, and henceforward will be maintained at the expense of the State.

MANOR HOUSE, MOUNT GRACE PRIORY.

THE Carthusian Priory of Mount Grace, near Ingleby Arncliffe, in Yorkshire, commonly called Mount Grace Priory, Northallerton, is by far the most perfect and interesting of the Charterhouses formerly existing in this country. It is doubtful if there is any spot where the arrangements of the mediæval Charterhouse can be studied to such advantage, since there is no feature that cannot be found in one or another of the old dwelling-houses, which date from 1399-1420.

The building with which we are concerned does not, however, belong to the actual part of the establishment inhabited by the Carthusians, but forms part of the range enclosing the outer court, and runs north and south adjoining the old gatehouse, of which nothing remains above the gateway level.

In or about the year 1654 (the date is inscribed on the entrance porch) Mount Grace came into the possession of a member of the Lascelles family, and the new owner at once proceeded to "modernise" a portion of the buildings and turn them into a dwelling-house. This he did by taking a portion of the building on the west side of the outer court, about 130 ft. in length and 17 ft. 6 in. wide between the walls, and dividing it up into rooms by thick cross walls, in which he put fireplaces, and cutting a row of windows along the west front; he seems also to have raised the roof and built a row of three gables with a battlemented parapet between. Of these, only two gables remain, but there is evidence of the existence of the third. He also improved the

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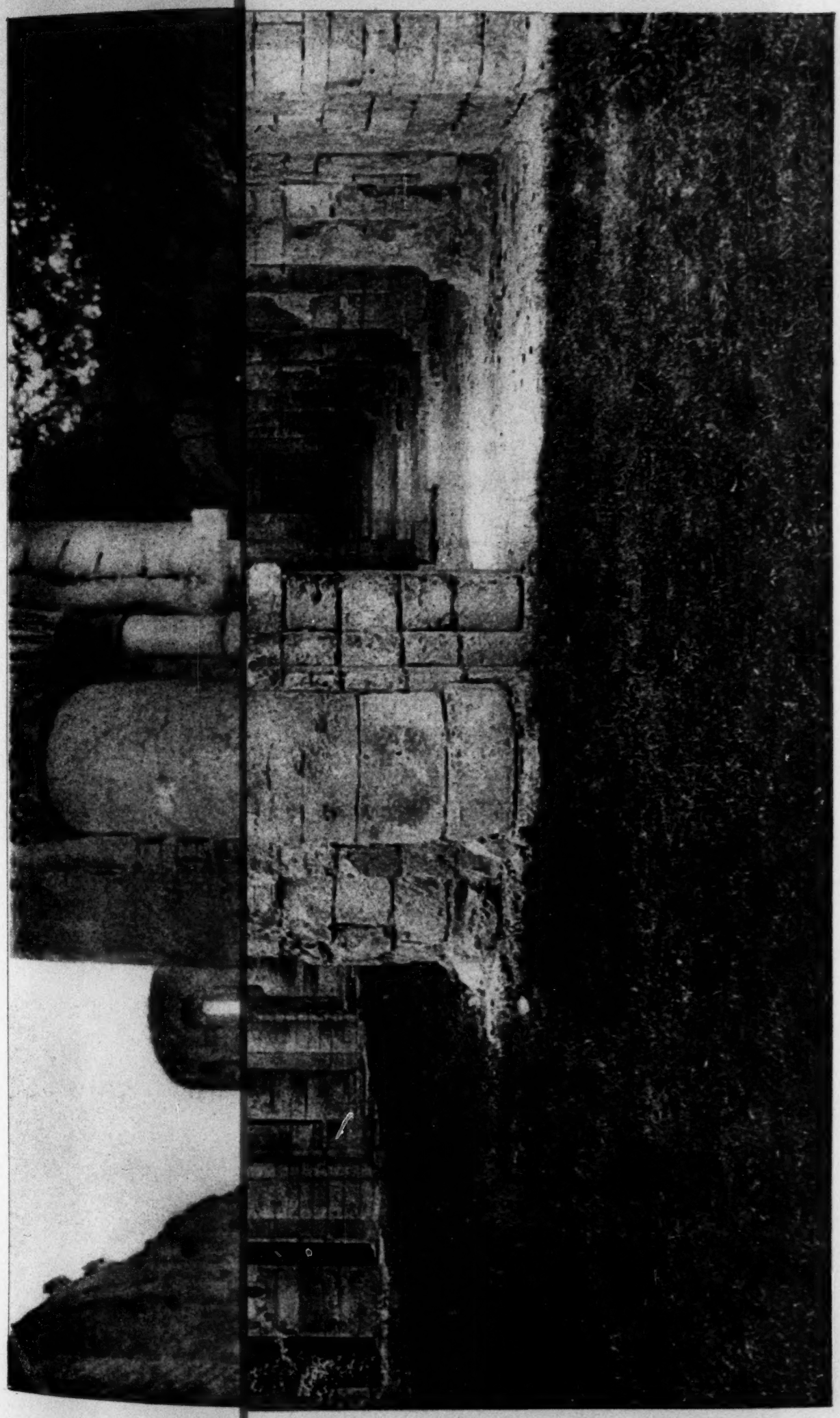

JUMIÉGES: NORTH AISLE OF NAVE (FROM EAST).

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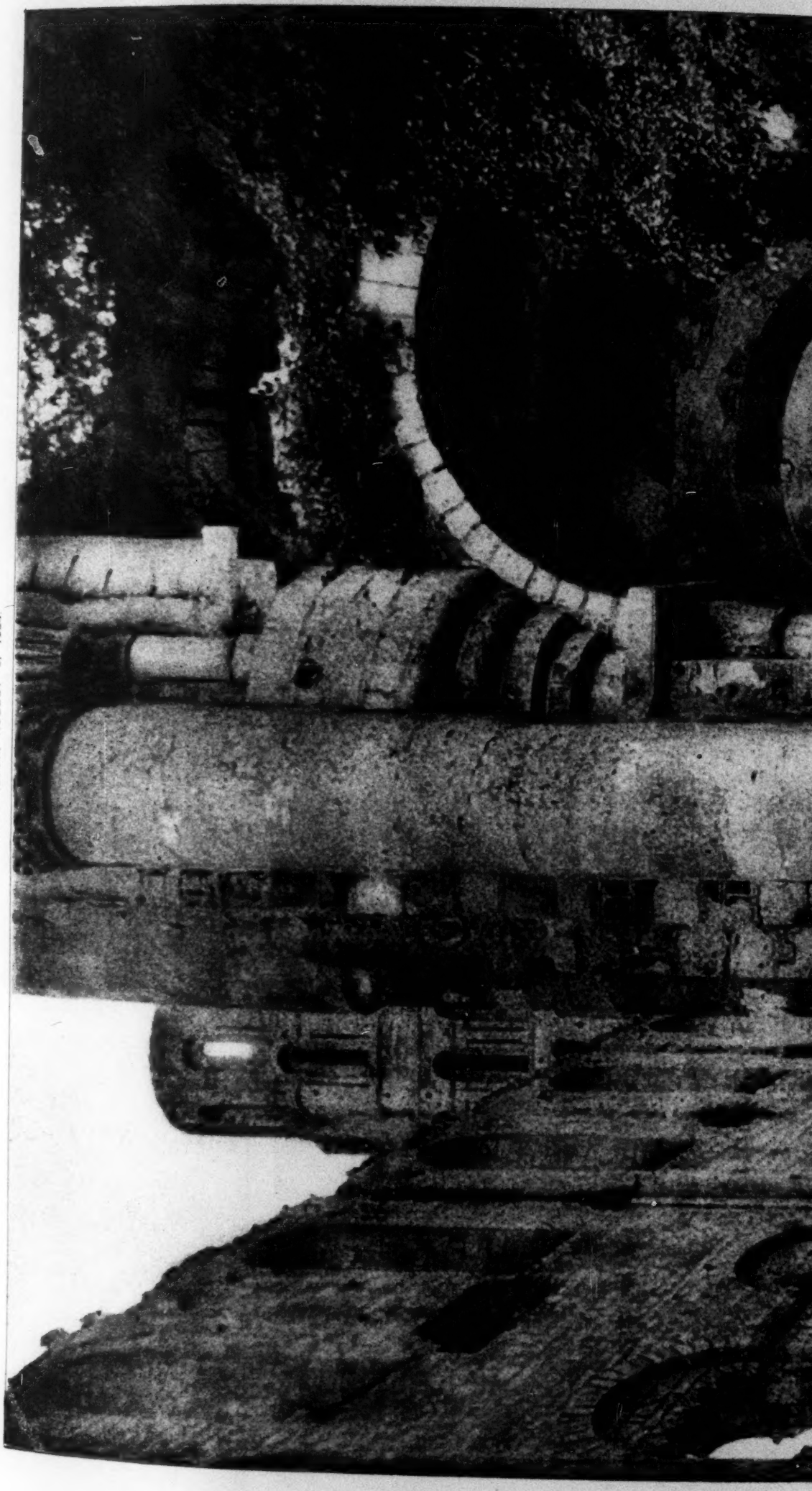

THE BUILDER, AUGUST 6, 1904

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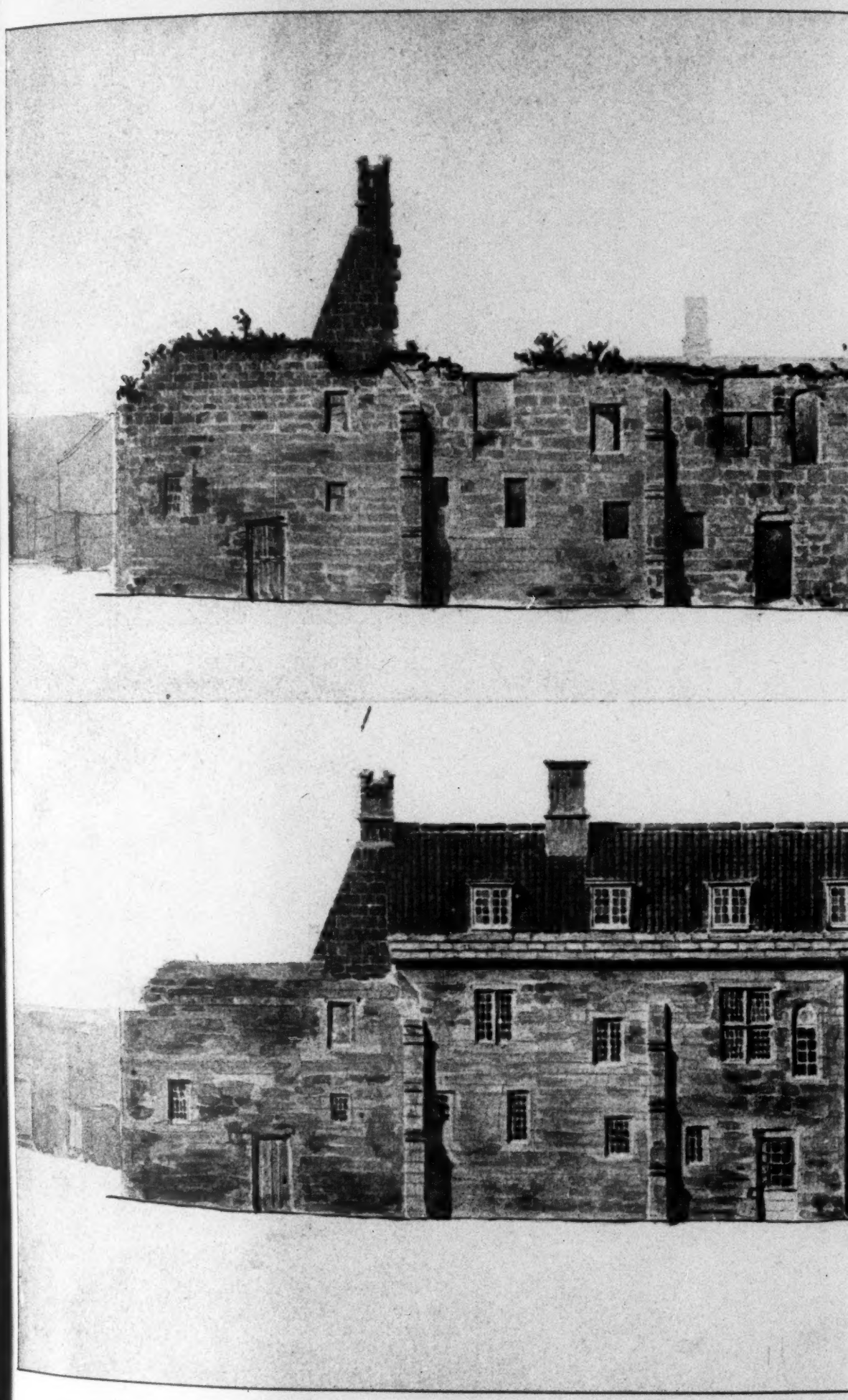
JUMIÉGES: NORTH AISLE OF NAVE (FROM EAST)



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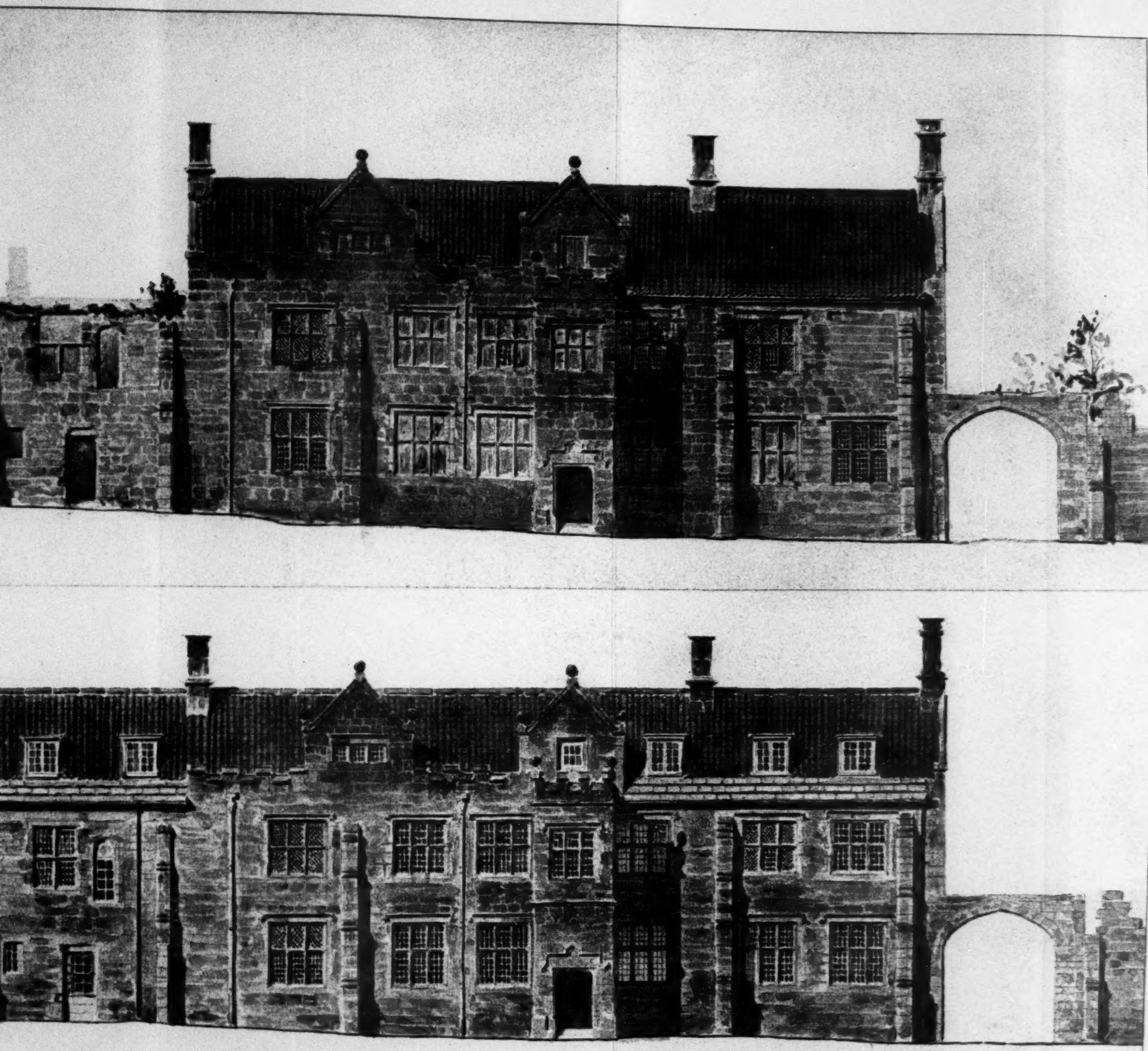

West: Elevation.

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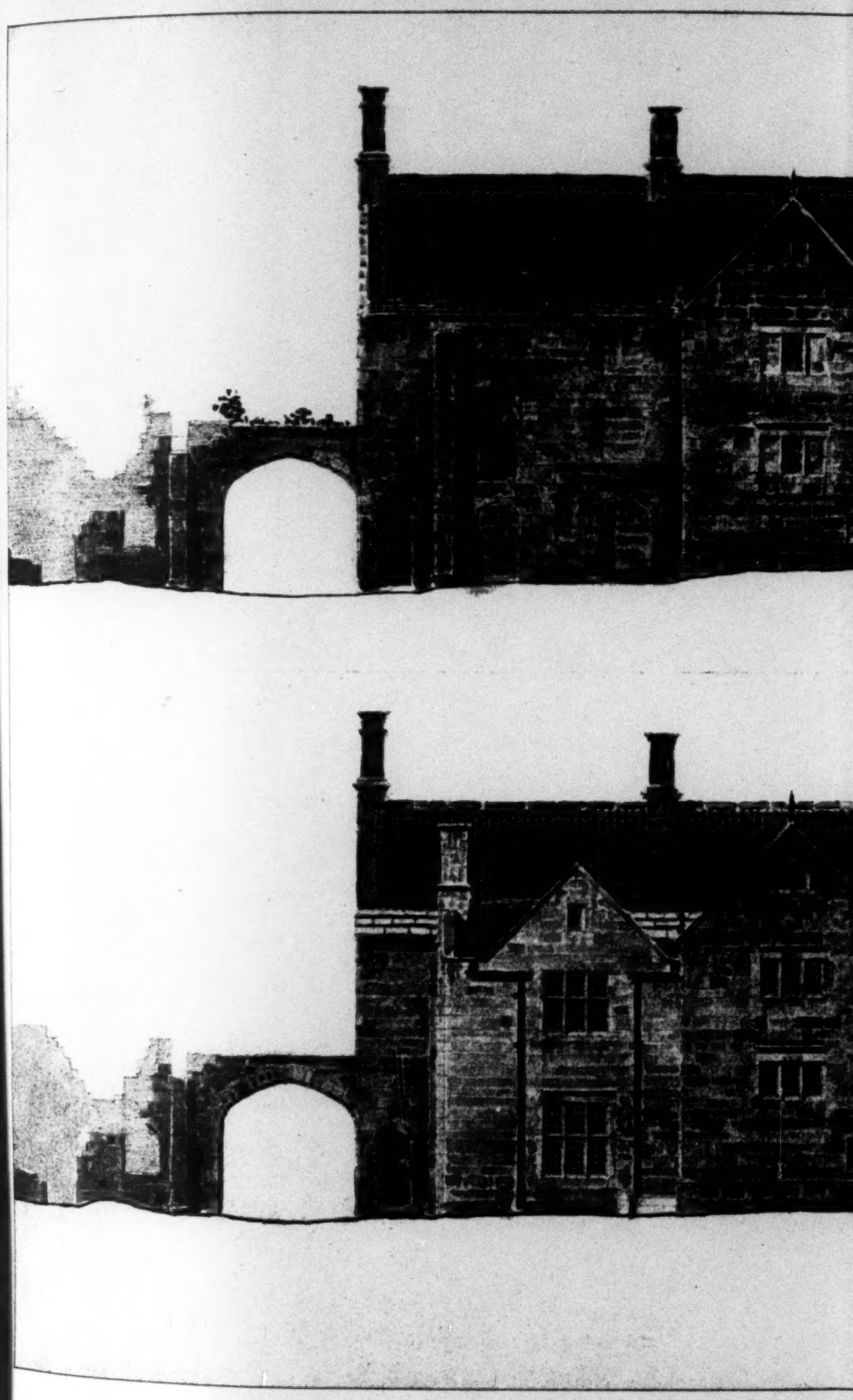
HOUSE, MOUNT GRACE PRIORY, NORTHALLERTON: ORIGINAL STATE AND ADDITIONS.

MR. AMBROSE M. POYNTER, ARCHITECT.



MANOR HOUSE, MOUNT GR

East: Elevation.

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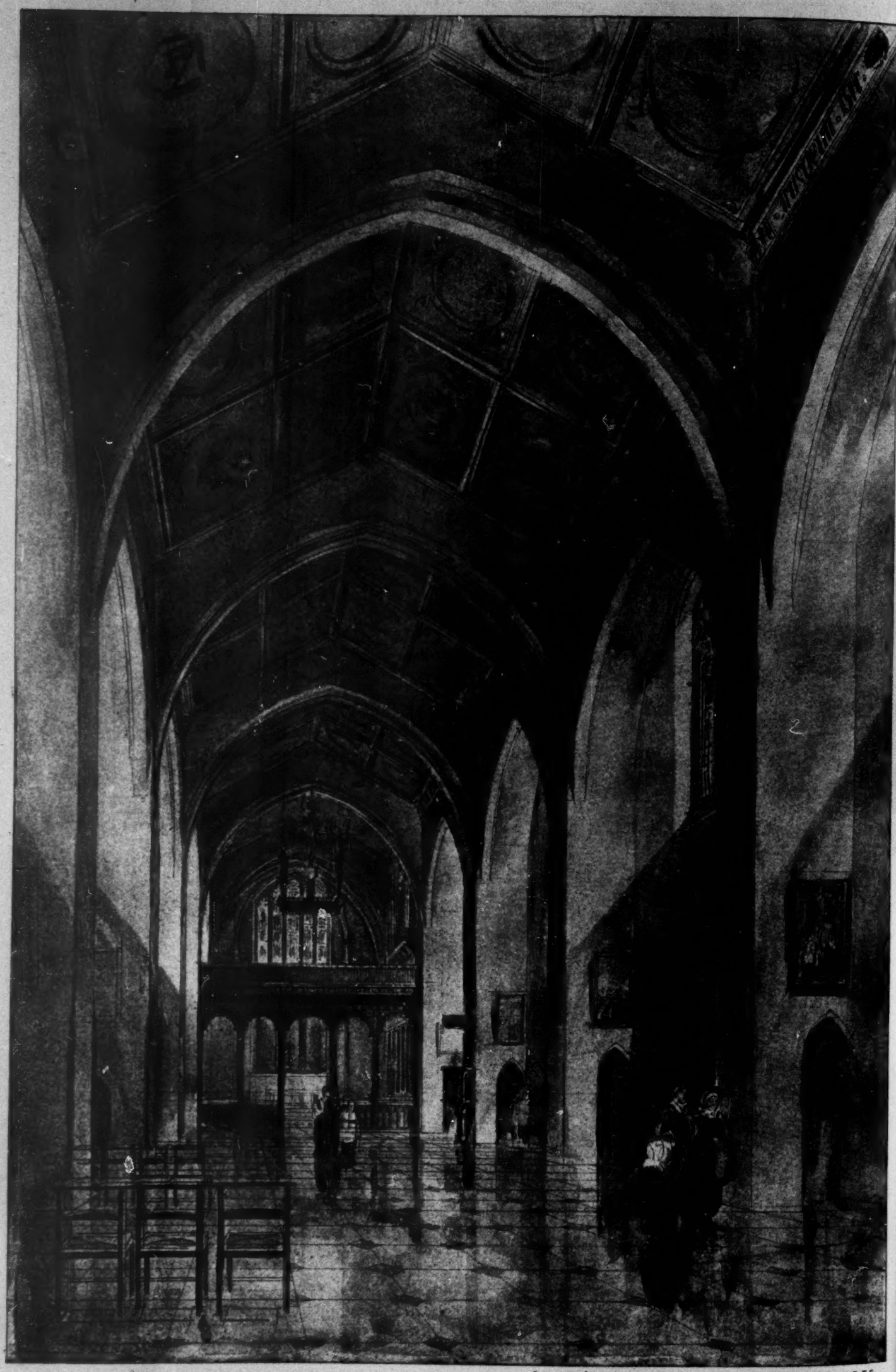

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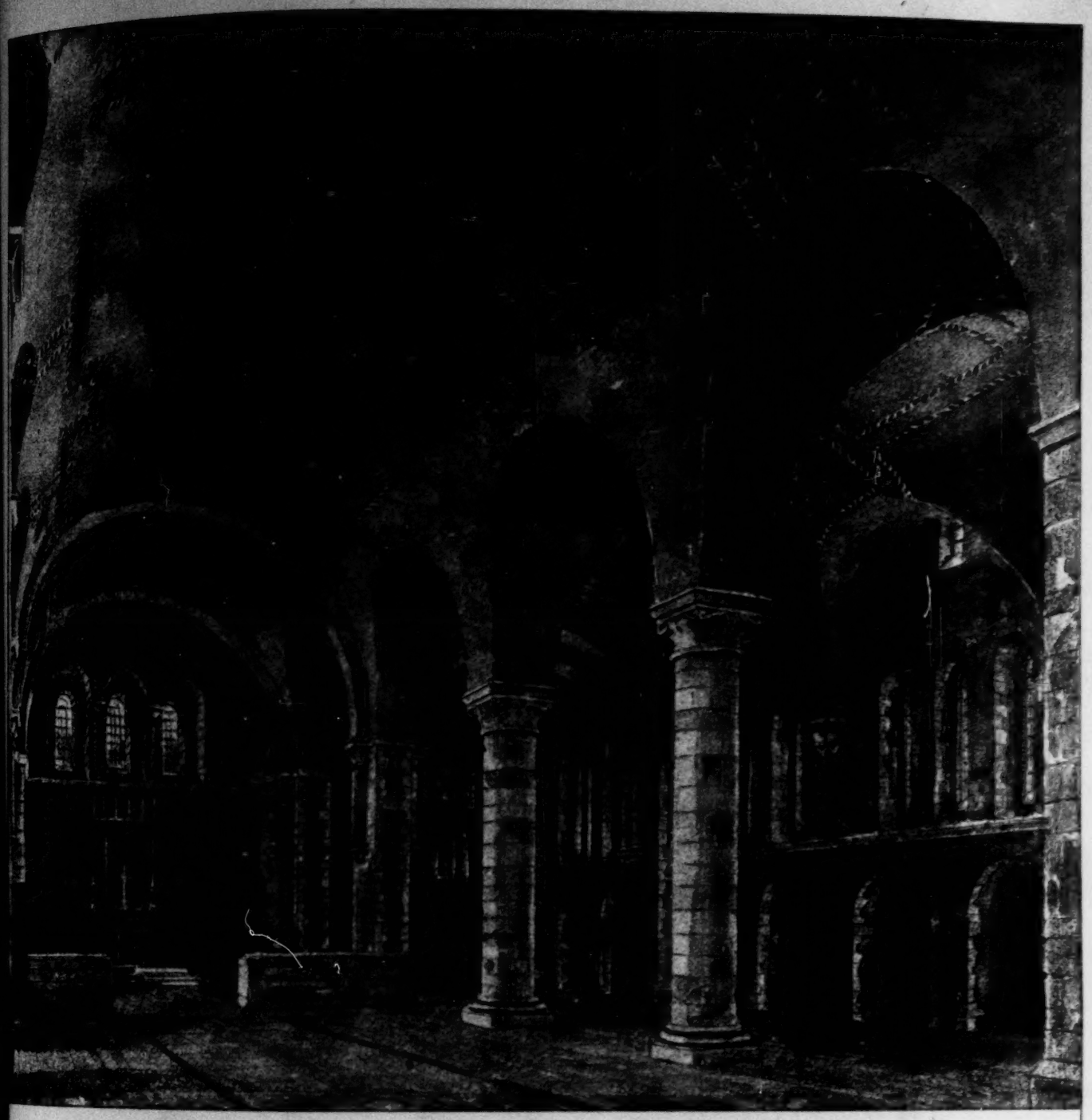
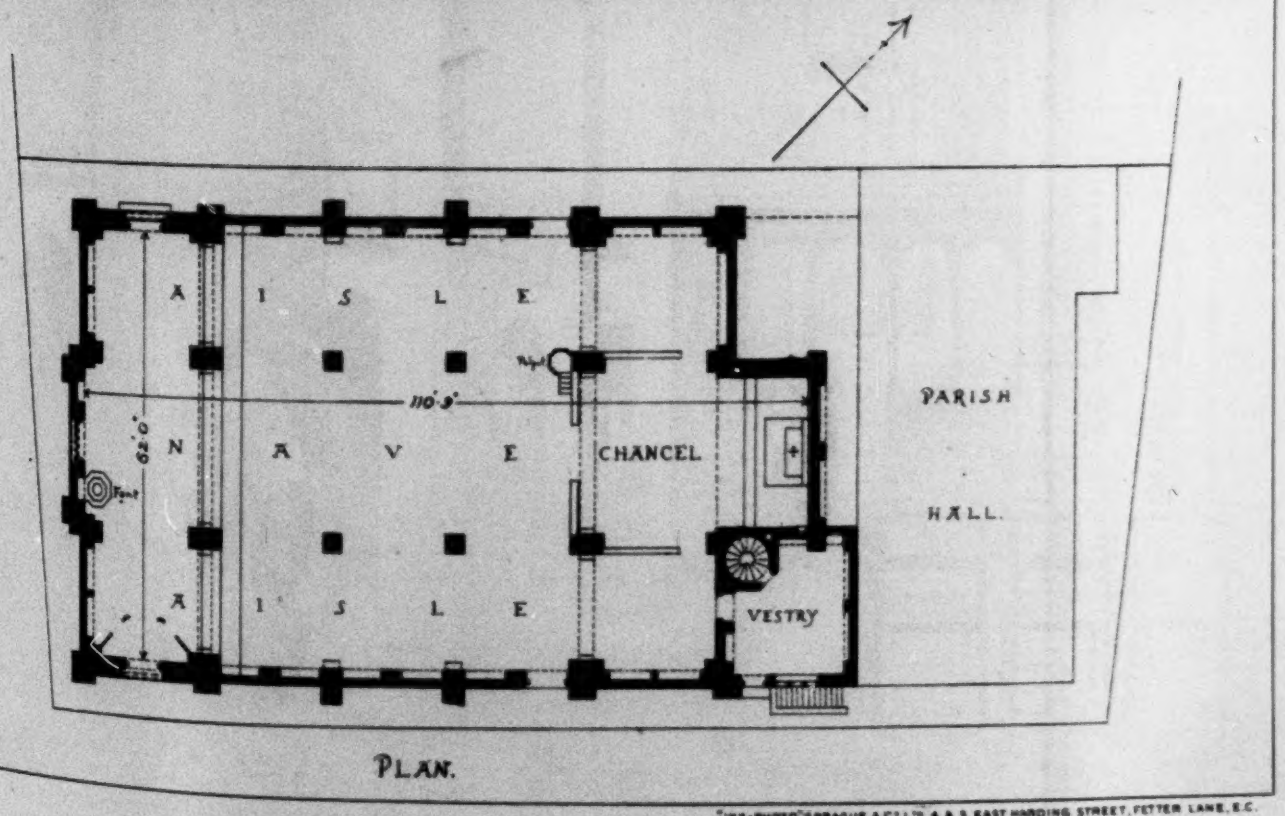
DESIGN FOR A TOWN CHURCH.—By Mr. W. J. Tapper, A.R.I.B.A.





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SKETCH FOR THE CHURCH OF THE ASCENSION, PLUMSTEAD, KENT.—By Mr. C. H. M. Mileham.

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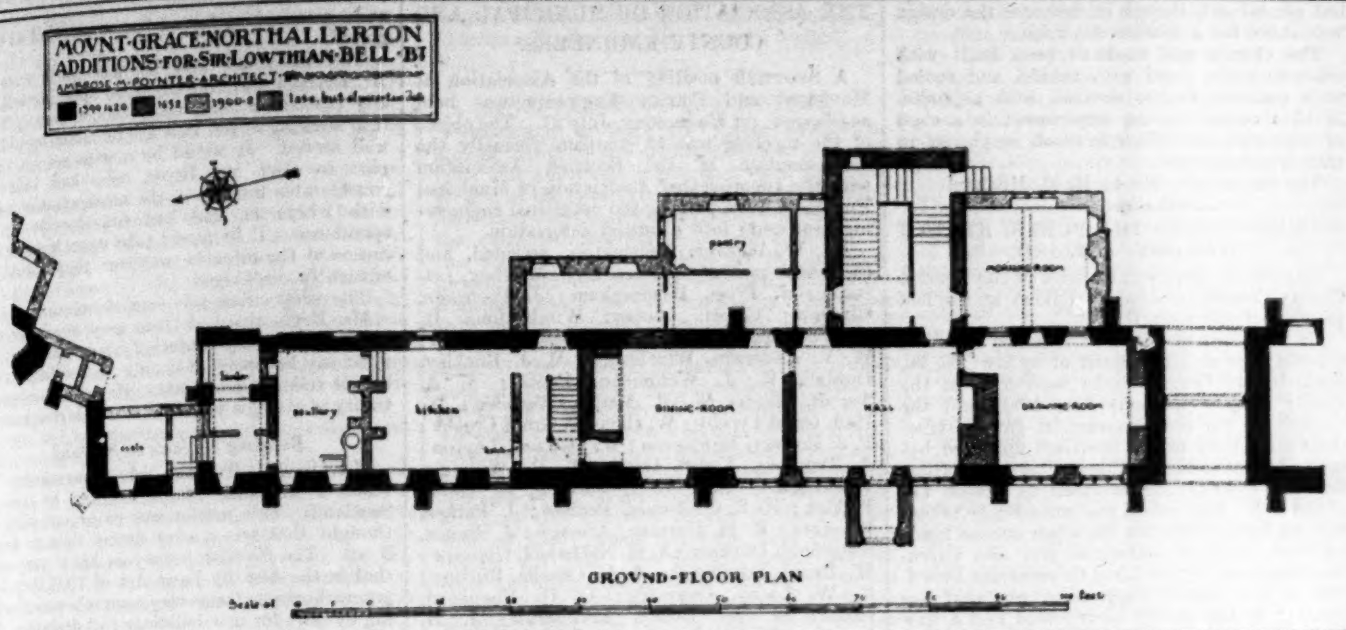


house by building a porch in front and a staircase out at the back.

Not very long after he had done this he had to part with his property, which in 1900 came into the hands of Sir Lowthian Bell, Bart. The building was by this time in a bad state of decay, and was hardly more than a farmhouse, inhabited by a caretaker, whose cows grazed in the inner courtyard of the priory.

The whole place was in a dangerous state of disrepair when Sir Lowthian Bell determined to repair it and convert it into a dwelling-house. Its condition is partly indicated on the two main elevations, which show the building as it was before the work of repair was begun.

The roof was in the last state of decay, and so were most of the floors; half of the windows were blocked up; the walls and ground floor were very damp (for the whole building stands on deep clay); and the top three or four courses of the old wall at the north end, which was unroofed, were loose and displaced by grasses, shrubs, and even trees, that were growing between the joints; the old chimney at the north end was full of cracks, and ready to fall.

To make the house fit for habitation, it was necessary to add one or two extra rooms and an external passage; this was done on the east side front, the rooms being added on each side of the projecting staircase wing and joined on to the stone toothing which, as it happened, already existed on each side of this wing at the point where the new walls now join on to the old; it is evident that some additions were intended here in 1654.

The old kitchen of the house, which had a larder, coal bunker, and a small staircase partitioned off from it, was cleared out and made into a dining room, and in taking out the old kitchen range the large open fireplace shown in the plan was discovered.

The open court beyond was divided up by brick walls into a back stair, kitchen, and scullery, the scullery being carried up two stories in height, so as not to hide the arches supporting the chimney of the old fireplace, the space occupied by the old fireplaces being turned into a larder.

On the first floor the partitions dividing the old rooms—which were of clay plastered over—were re-arranged, and a series of attic rooms provided in the roof, which was entirely renewed with the exception of the old oak trusses, which were patched up and re-used. The new roof has a border of stone slates with Yorkshire pantiles above. No other attempts were made at restoration anywhere, except that a new window to match the old was put in the west front at the south end, at a point where the failure of a roof truss had pushed out the wall and evidently destroyed the old window, of which the hood remained in the wall.

The building of Thomas Lascelles in 1654 is remarkable for its character; it might have been erected 100 years earlier, for it is purely Tudor in appearance and shows not the slightest trace of classic influence.

It is also remarkable in this building that at every point where two walls join, they are built with straight joints; this is even so in the case of the porch, as well as in the case of the older work.

Various excavations of great interest were carried out by Sir Lowthian Bell in the precincts of the monastic buildings, and resulted in the discovery of the ancient conduit in the cloister-garth, and the recovery of the stone arcades of the cloisters, besides various details, such as the bases and caps of the chimneys of the cells and of the crosses which surmounted their gables. In this and in various matters connected with the examination and repair of the Manor House buildings, the architect had the kind and invaluable assistance of Mr. St. John Hope.

The work was begun under the superintendence of Mr. A. H. Powell, who acted as clerk of the works and made all arrangements connected with carrying on the building, including the re-opening of an old quarry on the hill at the back of the house. Owing to illness, he was unfortunately compelled to give up this work, which was then continued by Messrs. T. W. Ridley and Sons, of Middlesburgh, who provided all labour and made all arrangements, the work being entirely carried on as day work under the superintendence of the architect.

The building was very carefully measured, before anything was done, by the architect and Mr. Pieter Rodeck.

AMBROSE POYNTER.

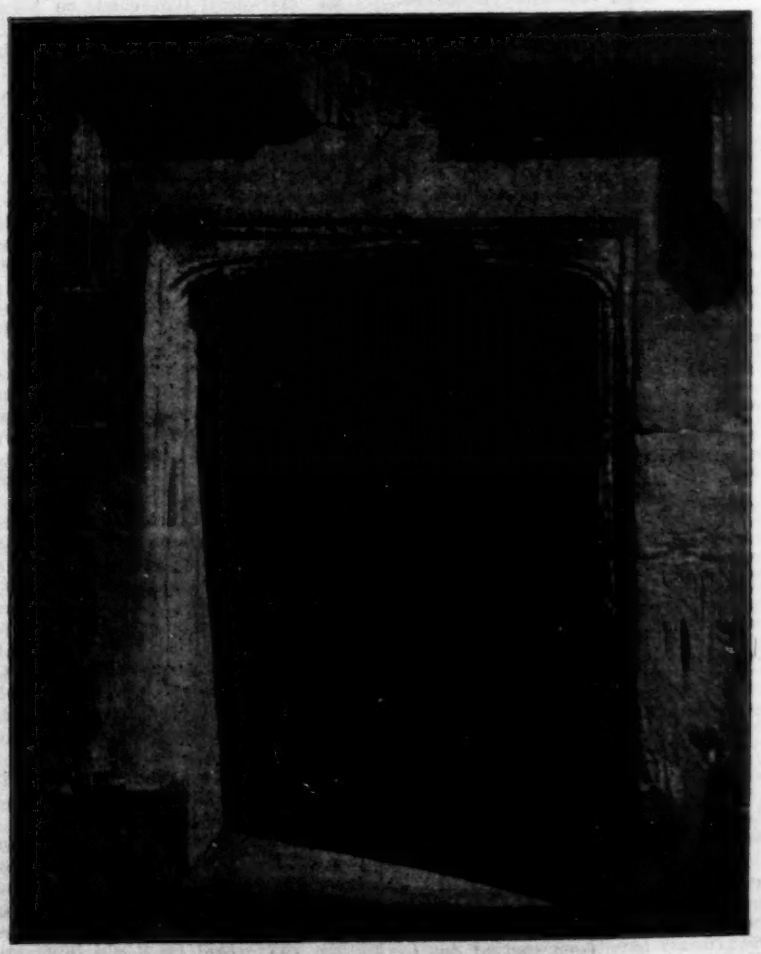
DESIGN FOR A TOWN CHURCH.

THIS drawing, which was exhibited at the Royal Academy, is merely a study for a treatment of the interior of a town church which should combine largeness and breadth of effect with economy.

Mr. W. J. Tapper is the author.

DESIGN FOR CHURCH OF THE ASCENSION, PLUMSTEAD.

THIS is also a design for a church which was



Detail of Entrance Doorway, Mount Grace Priory.

not carried out, though in this case the design was made for a definite situation.

The church was to have been built with concrete walls, faced with rubble, and roofed with concrete vaults, covered with asphalte. It thus constitutes an experiment in a class of materials not hitherto much employed in church architecture.

The design is by Mr. C. H. M. Mileham.

BY-LAWS UNDER THE PUBLIC HEALTH (LONDON) ACT, 1891.

THE Public Health Committee of the London County Council reported as follows at the last meeting of the Council:—

On February 16, 1904, we reported as to the necessity for an amendment of by-law No. 26, made by the Council under section 39 of the Public Health (London) Act, 1891, and the Council, on our recommendation, gave instructions for a copy of the proposed amended by-law to be sent to the London sanitary authorities for their observations pursuant to section 114 of the Act. This action was accordingly taken, and we have considered the observations made by these sanitary authorities and also alterations suggested by the Local Government Board. One of the Board's suggestions was that the existing by-law should be repealed and a new by-law made in its place, including a clause providing for penalties.

We are advised that before effect can be given to the alterations suggested by the Board it is necessary to again submit the by-laws to the sanitary authorities. We therefore recommend—"That copies of the proposed by-laws set out in Appendix I. to this report be sent to the London sanitary authorities pursuant to section 114 of the Public Health (London) Act, 1891."

The recommendation was agreed to. The following is the appendix referred to:—

"*By-laws made by the London County Council under section 39 (1) of the Public Health (London) Act*, 1891, *with respect to water-closets, earth-closets, privies, and receptacles for dung.*

"1. The occupier of any premises shall cause every water-closet belonging to such premises to be thoroughly cleansed from time to time as often as may be necessary for the purpose of keeping such water-closet in a cleanly condition.

"The occupier of any premises shall once at least in every week cause every receptacle for dung belonging to such premises to be emptied and thoroughly cleansed.

"Provided that where two or more lodgers in a lodging-house are entitled to the use in common of any water-closet, or receptacle for dung, the landlord shall cause such water-closet to be cleansed, or receptable for dung to be emptied and cleansed as aforesaid.

"The owner of any lodging-house shall, subject to the provision hereinafter specified, provide and maintain in connexion with such house, water-closet, earth-closet, or privy accommodation in the proportion of not less than one water-closet, earth-closet, or privy for every twelve inmates of such house.

"Provided that proceedings shall not be taken against the owner of any lodging-house for an offence against the last-mentioned requirement of this by-law unless and until the owner, after service upon him of a notice in writing by the sanitary authority, requiring him within such reasonable time as is specified in the notice to comply with the by-law, has failed to comply with the by-law within the time so specified.

"For the purposes of this by-law, a 'lodging-house' means a house or part of a house which is let in lodgings or occupied by members of more than one family. 'Landlord' in relation to a house or part of a house which is let in lodgings, or occupied by members of more than one family, means the person (whatever may be the nature or extent of his interest) by whom or on whose behalf such house or part of a house is let in lodgings or for occupation by members of more than one family, or who for the time being receives or is entitled to receive the profits arising from such letting. 'Lodger,' in relation to a house or part of a house which is let in lodgings or occupied by members of more than one family, means a person to whom any room or rooms in such house or part of a house may have been let as a lodging or for his use or occupation.

"Nothing in this by-law shall extend to any common lodging-house.

"*Penalties.*

"2. Every person who shall offend against the foregoing by-law shall be liable for every such offence to a penalty of 5*l.*, and in the case of a continuing offence to a further penalty of 40*s.* for each day after written notice of the offence from the sanitary authority.

"Provided, nevertheless, that the court before whom any complaint may be made or any proceedings may be taken in respect of any such offence may, if they think fit, adjudge the payment as a penalty of any sum less than the full amount of the penalty imposed by this by-law.

"*Repeal of by-law.*

"3. From and after the date of the confirmation of these by-laws, the by-law numbered 26 (twenty-six) in the by-laws relating to water-closets, earth-closets, privies, ash-pits, cesspools and receptacles for dung, and the proper accessories thereof in connexion with buildings, which were made by the London County Council on June 22, in the year 1893, and were confirmed by the Local Government Board on June 28, in the year 1893, shall be repealed."

OPERATING THEATRE, CHESTER INFIRMARY.—A new operating theatre has been opened at the Chester General Infirmary. The structural arrangements have been carried out by Messrs. T. M. Lockwood and Sons, Chester.

THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A SCOTTISH meeting of the Association of Municipal and County Engineers was held at Glasgow, on Wednesday, July 27. The object of the meeting was to complete formally the amalgamation of the Scottish Association with the Incorporated Association of Municipal Engineers, thus welding the municipal engineering profession into a united association.

Mr. W. Weaver, Kensington, presided, and there were present—Messrs. E. G. Mawbey, Leicester; J. Price, Birmingham; J. Cochrane, Glasgow; C. H. Cooper, Wimbledon; H. Silcock, Mansfield; A. H. Campbell, East Ham; W. V. Anderson, Winchester; M. J. Buckley, Dublin; R. J. Wolfenden, Bootle; A. A. Turriff, Elgin; W. B. Madin, Rushden; W. Hall, Great Crosby; W. Gleaves, Great Crosby; F. J. Rayner, Newhaven; W. Dawson, Leyton; J. Trumble, Forest Gate; H. B. Williams, Workington; D. Ronald, Falkirk; — Massie, Falkirk; R. S. Anderson, Peebles; J. Parker, Hereford; R. H. Dorman, Armagh; J. Stones, Sedgefield, Durham; A. H. Nathaniel, Glasgow; W. Bruce, Edinburgh; A. H. Goudie, Stirling; G. W. Lacey, Oswestry; G. G. Shepherd, Ilford; G. W. Tutley, Edinburgh; J. R. Lunsden, Kirkcaldy.

The Chairman said, although he was not President at the present moment, the President who was elected and installed at Shrewsbury a fortnight ago had kindly allowed him to take the chair in order that he might welcome the Scottish members coming into the fold of their association. He, Mr. Davis, had left that duty to him inasmuch as he virtually initiated the movement that they were completing. On behalf of the Association he begged to tender to the Scottish members who had amalgamated with their Association a hearty welcome to their ranks, and he trusted that the amalgamation which they effected might be to the advantage of all the members who were joining. He was quite sure personally that it was to the mutual interests of all the members holding appointments throughout Great Britain to be in touch one with another, both for the object of mutual improvement and mutual support, and he trusted that in the future events would prove the wisdom of their action. He, therefore, begged to give them a hearty welcome, and to express his own personal feelings of pleasure in meeting them there.

Mr. McDonald (Glasgow), on behalf of the Scottish Association of Municipal Engineers, which had now ceased to exist, begged to acknowledge the very kind observations that the Chairman had been pleased to address to them, and he cordially acquiesced and thoroughly believed in the accuracy of his anticipations that the amalgamation would be of mutual benefit. He was quite sure that the strong current of Scottish blood which was to be infused into the English association could not fail to be otherwise than advantageous, and as the period was far too remote for the memory of any man to remember any such thing as racial difference, he was quite sure they would all benefit from the closer relations which would exist with their professional *confrères*. He hoped that the associations now combined by amalgamation in enhanced usefulness would prove of the highest benefit to the profession, and that they would all avail themselves of the opportunity that now lay before them of attending meetings of the Association of Municipal and County Engineers.

The Chairman said the next business was the election of an honorary district secretary. Mr. Dyack, of Aberdeen, the present secretary, who was unable to be present, was not prepared to continue in office. It, therefore, rested with the Scottish members to elect someone from their ranks, who they thought would be a fit and proper person to fill the office. Of course, the member who was elected to discharge the duties of secretary for the Scottish district by virtue of that office became a member of the Council of the Association.

Mr. J. Pritty (Selkirk) proposed the re-election of Mr. Bryce, of Partick, as honorary secretary for the Scottish district.

Mr. Massie seconded the nomination of Mr. Bryce. He had been a friend of the Scottish Association from its inception, and if Mr. Bryce could see his way to accept the office, he was the right man in the right place.

Mr. Bryce said he would have preferred if someone else could have taken this matter up, as he was looking forward to some relief at this period.

The Chairman said he was quite sure if Mr. Bryce would take the office upon himself, at any rate for a year, while things were getting into working order, that the members would be well served. It would be a wise act on their part to elect Mr. Bryce, who had taken a considerable interest in the amalgamation, and with whom he had had considerable correspondence. If he would take upon himself the duties of the office he was sure they would be efficiently discharged.

The proposition was carried unanimously.

Mr. Bryce thanked them very much for the honour they had conferred upon him, but he must say he accepted it only on condition that he got relieved next year. He took the opportunity of giving a year's notice of his resignation.

Building By-laws in Scotland.

Mr. Bryce, Partick, asked permission to make a statement about building by-laws in Scotland. This matter was so urgent that he thought that was a very fitting time to bring it up. The Scottish surveyors knew very well that in the new By-Laws Act of 1903 they had got authority to frame very comprehensive building by-laws for new buildings and drainage. He thought the list of them was more comprehensive than what was provided for by the model by-laws in England, but he might be wrong on that point. He thought that was the time to appoint a committee of their Scottish members to frame a uniform code of by-laws in respect of Scotland. It was quite true there were a great many local differences which would necessitate the alteration of the by-laws for particular towns, but on the main points the by-laws could be made uniform and adapted to Scottish practice. He need not inform their English friends that their by-laws were practically of no use to them. They knew that in England they were also looking into the matter of their by-laws, and making improvements on the model by-laws, so probably they might get some hints from them in this matter. There was also the question of the form of the by-laws as well as the uniformity. There had been a good deal of discussion lately about by-laws being too fixed, definite, and stringent in their specification. He remembered reading the evidence given before the Glasgow Housing Committee last year, and some of the witnesses made very strong objection to the Glasgow building by-laws on that ground. The question would arise as to the best form in which to mould the by-laws. He might be wrong, but he thought, in addition to the deliberations of the Glasgow Housing Committee, they might be assisted by the views of the Royal Institute of British Architects and the Surveyors' Institution, as well as the Borough Officials' Association of Scotland, and the National Plumbers' Association. It seemed to him that they had a clear field before them, as they had no model by-laws in Scotland. Therefore they had to take this opportunity of appointing a committee and framing a model code for the Scottish boroughs. If this proved to be the feeling of the meeting, he was prepared to suggest a committee. He moved that a Committee of Scottish members be appointed to draft a code of model by-laws.

Mr. Holmes, Govan, seconded the proposition. The Act of 1903, which came into force in May, required the framing of by-laws. He thought a general code of by-laws was very necessary, because where they had separate boroughs joining up to each other very often trouble arose, and there were difficulties as to house drainage and the trapping of drains. If all the boroughs in Scotland could be induced to adopt a uniform system of by-laws it would conduce to the benefit of all.

Mr. J. Price, Birmingham, speaking as a member of the By-law Committee of the Council of the Association, thought the Scottish section would be very wise in adopting the procedure proposed by Mr. Bryce, of drafting their own by-laws and not waiting until the Local Government Board or some other Government Department made them for them. Unfortunately that was what had happened in England. The Local Government Board made the by-laws, and they had had to suffer for them ever since. They were now trying to frame a set of by-laws which would be workable, which was more than could be said of those which had been used in the past. In making the by-laws it was well to make them sufficiently wide in scope, and yet not too wide to be *ultra*

vires. They did not want to be too stringent as to buildings, all they needed was to make the walls sufficiently stable, the roofs tight, and the drainage satisfactory. To do more than that was to go beyond their purview. He thought the movement the Scottish members were promoting that day was one eminently in their interests.

The Chairman then put the resolution, and it was carried unanimously.

Mr. Bryce, Partick, then proposed that the following form the committee: Messrs. Kellop, Perth; Lee, Paisley; Turnbull, Greenock; Holmes, Govan; Young, Ayr; Ronald, Falkirk; Goudie, Stirling; Wilson, Helensburgh; Wenning, Broughty Ferry, and Lumsden, Kirkcaldy. He explained that, as the by-laws would not affect Glasgow, Aberdeen, and Edinburgh, he had omitted the engineers of those cities.

Mr. Holmes, Govan, seconded the proposition, which was carried.

On the proposition of Mr. J. Parker, Hereford, a vote of thanks was accorded to Mr. Dyack for his services as secretary of the Scottish district, and votes of thanks were also accorded to Mr. W. Weaver for presiding, and to Mr. McDonald, of Glasgow, for his services as President of the now Amalgamated Scottish Association.

NATIONAL FEDERATION OF BUILDING TRADES EMPLOYERS.

THE annual summer meetings of the National Federation of Building Trades Employers of Great Britain and Ireland opened at Scarborough on the 26th ult. Meetings of the Council, which were private, took place morning and afternoon at the Grand Hotel, which was the headquarters of the Federation during its visit to Scarborough.

In the middle of the day the Federation was formally welcomed to the town by the Mayor, Councillor W. Morgan, who, attended by the Deputy Mayor (Councillor J. Sinfield), met the master builders in the Council Chamber at the Town Hall.

Alderman W. H. Jessop, of Huddersfield, President of the Federation, acknowledged the welcome.

A banquet was held in the evening at the Grand Hotel. Mr. E. Good, President of the Yorkshire Federation, presided, and there were in all about 170 guests.

Mr. J. Dawson, of Huddersfield, in proposing "The National Federation of Building Trades Employers," said the credit, he believed, belonged to Lancashire for establishing the Federation, and in a few months Yorkshire followed suit. It was a success from the first, and to-day they held the respect of the officials of the men's union. He believed there would be fewer strikes in the future, because of the respect they had inspired. They intended to have fair play; they did not want anything that was wrong; they only wanted fair dealing, to be treated respectfully, and to have freedom to carry on their business.

Alderman W. H. Jessop responded.

Councillor Green, of Liverpool, proposed "The Mayor and Corporation of Scarborough," and Councillor Morgan and Councillor J. Sinfield responded.

Mr. C. H. Barnsley proposed "The Architects and Engineers," and, referring to the proposed statutory registration of architects, said, as practical men, they would respect and admire more than ever the profession whose members were able to combine skill of construction and business methods with the abilities of the artist.

Mr. F. A. Tugwell (Scarborough) replied.

Mr. W. Shepherd proposed "The Yorkshire Federation of Building Trades Employers." He said they heard a great deal about the decision of the House of Lords in the Taff Vale and other cases, but he ventured to think that these decisions had been led up to by minor cases. The Hull case and the Halifax case were fought with a persistency creditable to any association or federation which might have undertaken them, and in his opinion the persistency with which those cases were fought had helped just as much to elicit the judgments lately given as anything possibly could have done.

The Chairman replied, and said the Council that afternoon adopted the Yorkshire scheme, which had for its object a closer union between employer and employed. They hoped to bring those heathenish practices of strikes and lock-outs to an end.

The health of Mr. Poynton, President of the South African Federation, was proposed by Alderman Bowen, and Mr. Poynton replied.

ARCHITECTURAL SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS.—The annual report of the Sheffield Society of Architects and Surveyors states that upon the completion of the seventeenth year of the Society's existence, the Council has pleasure in recording the sustained interest in its work shown by the attendance of members at the ordinary monthly and intermediate meetings, and by the influence which it has exerted in connexion with public matters affecting the interests of the profession, and particularly by the attendance of the younger members at the classes and lectures. The Council regrets to have to record the death of Mr. W. F. Hemsoll (Fellow). The total number in each class is now three hon. members, 35 Fellows, 42 Associates, 17 students, and 20 lay members, total 117, as compared with 109 last year. With regard to public matters affecting the interests of the profession, the time of the Council has been fully occupied during the year. No further action has, to their knowledge, been taken with regard to the new building by-laws, and the Town Clerk has promised that the Society shall have further conference with the Highway Committee when the matter is again considered. The proposed competition in connexion with the Corporation building scheme at Wincobank, referred to at the last report, has been carried out, but upon the facts being put before the assessor and the Council of the R.I.B.A. by the Council of the Society, the assessor appointed refused to act, and the R.I.B.A. sent out a circular to its members and to members of allied societies asking them not to compete. In consequence of this an assessor was appointed by the City Council who was not a member of the R.I.B.A. or the allied societies, and the Corporation accepted a design which does not comply with their own building by-laws. The Council deeply regret the action of the Corporation in this matter, as by violating the established traditions of architectural practice they made it impossible for members of the R.I.B.A. or the allied societies to compete, and consequently the city lost the benefit of much valuable experience. In consequence of repeated representations made to it by various members of the R.I.B.A., the Council of that body has appointed a Special Committee to report upon the question of architectural work done in Corporation offices. The Master Builders' Association have recently again opened the question of the contract agreement form. The matter is still under the consideration of the Council, who will report to the members of the Society in due course. The statement of accounts shows that the Society has a balance in the bank of 24*l.* 16s. 7d.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—A visit was made by the President, Mr. D. B. Butler, and members of the Society of Engineers, on Wednesday, the 27th ult., to the Shipbuilding and Engineering Works of Messrs. Yarrow and Co., at Poplar, where they witnessed the building and engineing of light-draught high-speed craft of all kinds, notably torpedo-boats, destroyers, and light-draught gunboats. The main workshop consists of four bays, each 360 ft. in length. There are two engineers' shops, 50 ft. and 36 ft. wide respectively; a light machine shop, a heavy machine shop, a pattern-makers' and a joiners' shop, together with a large boiler-makers' shop and an extensive shipbuilding department. At the entrance to the works is a fine suite of offices, including a large, well-lighted drawing office. Electrical driving has been adopted in the works, the main motive power being supplied by three Belliss and Morcom compound condensing engines, which drive three Parker dynamos direct, each dynamo being capable of an output of 430 ampères at 210 volts. Steam is supplied by three Lancashire boilers. Over the boiler-house is a cast-iron tank in which is a Ledward evaporative condenser. The drainage from the main roofs is collected in the tank, and is used for condensing purposes, an economy in the use of the town water thus being effected. Most of the machine tools in the various shops are of the latest pattern, and are placed in groups, each line of shafting being driven by its own motor. The shafting is 3 in. in diameter, and runs at 140 revolutions per minute. The larger machines, which are not continuously at work, are driven by independent motors. The shops are fitted throughout with electric travelling cranes made by Messrs. Adamson. The air-compressing machinery is also driven electrically, a very complete pneumatic system being laid down throughout the works. There are arrangements for delivering compressed air on board vessels in course of construction on the river bank. The principal tools are fitted with pneumatic hoists. There is also a complete installation of hydraulic plant, which has been specially designed for the construction of the Yarrow water-tube boiler. Electric lighting is partially used in the establishment, the current being produced by the same dynamos that supply power; the circuits, however, are kept separate. The shops are all heated by steam which is taken from the main boilers, and the various departments are all in telephonic communication. These new works, which give employment to about 1,200 men, are of such capacity and so advantageously arranged that Messrs. Yarrow are enabled to carry out on the same premises nearly the whole of the operations connected with the building and engineing of the vessels they construct. The whole of the plant and machinery is of the newest type, and so laid down and arranged that they afford every facility for convenience in the execution of work and punctuality in its delivery. Upon the occasion of the Society's visit the members found the works generally in a state of considerable activity, and they inspected a number of boats of various types in all stages of construction.

THE JUNIOR INSTITUTION OF ENGINEERS.—The summer meeting of the Institution this year is to be held in Germany, Dusseldorf being the first stopping place. Here at the Town hall on Saturday, August 13, the members are to be welcomed into the Fatherland by the Burgomaster and the Society of Architects and Engineers of Dusseldorf. The Exhibition will be visited, and on Monday there will be an excursion to Oberhausen for viewing the works of the Gutehoffnungshutte (blast furnaces, steel works, etc.). The Beurather Crane Works will also be seen. On Tuesday the Elberfeld-Barmen mono-rail suspended railway is to be inspected in the morning, and in the afternoon the members proceed to Hanover for the purpose of visiting on the following day Messrs. Korting Brothers' Works, the Hanover Engine Works, and the works of the Westinghouse Brake Company. Thursday morning will be spent at Hanover, and in the afternoon Berlin will be reached. Here on Friday the overhead and underground railway will be seen, including car sheds, generating station, etc., also the Charlottenburg electrical engineering works of Messrs. Siemens and Halske. Saturday, August 20, will be spent in visiting the Mariendorf works of the Imperial Continental Gas Association and the Royal Technical High School at Charlottenburg. The members leave Berlin on the Monday for Leipsic, remaining there till Wednesday, when they go on to Frankfurt-on-Main to visit on Thursday and Friday, by invitation of Mr. W. H. Lindley, M.Inst.C.E., the municipal works, with an excursion to Homburg. On Saturday, August 27, the return journey to England will be made to include the Rhine from Brebrich to Bonn.

COMPETITIONS.

OSSETT TOWN HALL.—The scheme for the erection of a town hall, municipal offices, and borough court on a site in the market place was considered by the Ossett Town Council at a meeting of the General Purposes Committee on the 27th ult. The thirty-three sets of competitive plans which had been received were reported upon by Mr. John Kirk, of Dewsbury and Huddersfield, the assessor appointed by the Council, and on his recommendation the plans submitted by Messrs. Hanstock and Sons, of Batley, were selected. The town hall is to cost 12,000*l.*, exclusive of the site, which has been purchased at a cost of 5,560*l.*

STAMFORD FREE LIBRARY.—We have been asked to give publication to the following letter, which has been addressed to the competitors:—

"Town Clerk's Office, Stamford,
28th July, 1904.

BOROUGH OF STAMFORD.

FREE LIBRARY.

DEAR SIR,—My attention has been called to the fact that several of the competitors have not received

proper information herein. From time to time circular letters have been written by me to the competitors entering the competition and instructions given by me to a clerk to send the necessary details to every competitor. I now find, much to my surprise, that a number of the competitors have not received all the information.

The Chairman of the Free Library Committee has therefore, under the circumstances, agreed to further extend the time within which the plans are to be sent to me; therefore the time will be extended, in order to give each competitor an opportunity of entering the competition, until the 10th day of September next

If you have not received a block plan and instructions please let me know by return of post and the same will be sent to you.

Further, if you have already sent in your designs for the Free Library Building the same will be returned to you, if you so desire, in order that you can spend the extended time upon them.

I enclose a circular letter written by me on the 2nd June last.

Yours faithfully,
CHARLES ATTER,
Town Clerk."

BOOKS RECEIVED.

PROPERTIES OF BRITISH STANDARD SECTIONS. Issued by the Engineering Standards Committee. (London: Crosby Lockwood and Son, and Offices of Committee, 28, Victoria-street, S.W. 5s. net.)

HADDON HALL. By F. H. Cheetham. (London and Manchester: Sherratt and Hughes. 2s. 6d.)

TIMBER. Edited by Paul N. Hasluck. (Cassell and Co. 6d.)

BOOK-KEEPING FOR BUILDERS. Edited by Paul N. Hasluck. (Cassell and Co. 6d.)

THE STANDARDS OF FIRE RESISTANCE OF THE BRITISH FIRE PREVENTION COMMITTEE. (London: Offices of the British Fire Prevention Committee, Waterloo-place, Pall Mall.)

BUILDERS' HOISTING MACHINERY. Edited by Paul N. Hasluck. (Cassell and Co. 6d.)

TECHNOLOGICAL AND SCIENTIFIC DICTIONARY. Edited by G. F. Goodchild and C. F. Tweney. (London: George Newnes, Ltd.)

HANDY NEWSPAPER LIST, 1904. (London: C. and E. Layton. 6d.)

THE INSURANCE REGISTER. (London: C. and E. Layton. 1s.)

"RED BOOK" ON ADVERTISING. (London: F. E. Coe. 2s. 6d.)

Correspondence.

A TWOFOLD IMPROVEMENT.

SIR,—One of the finest sites in London is at present occupied by the most hideous of churches—that is to say, Pentonville.

One of the best churches in the City, at present quite useless, is buried behind the Mansion House. If this church—St. Stephen's, Walbrook—were taken down and removed to replace Pentonville church, it would be seen from many points in the City and suburbs.

The City and Corporation would gain greatly by such an improvement, for the site of St. Stephen's, together with the adjoining churchyard, would provide quite a decent-sized garden for the Mansion House.

The garden could be approached by means of a steel balcony, crossing the Mansion House passage, accessible from the Egyptian Hall, and descending by means of light steel staircases. I think that if the attention of the Corporation and of the authorities of Clerkenwell could be called to consider this matter, there would not be much difficulty in carrying out this improvement. WALTER SCARGILL.

WANDSWORTH BATHS COMPETITION.

SIR,—I have been invited by the Council of Wandsworth Borough to submit a design in competitor for proposed new public baths, to cost 4,500*l*. Twenty-two other architects have also been similarly honoured. Assuming that each architect spent in time and money 20*l*. on his design, the net out-of-pocket expenses would be rather more than double the amount of commission that the successful competitor would receive. It will be interesting to see how many of the twenty-three architects invited enter into the struggle for this vast commission. The conditions have been drawn up by the assessor, appointed by the Council, and, evidently in a spirit of gentle irony, it is stated that no competitor may submit more than one set of drawings. As these are to consist of four plans, two elevations, two or three sections, ½-in. details, etc., it is doubtful if such a clause to check "vaulting ambition" is really necessary. If the Council, under their by-laws, had to go to competition, surely it would have been better to make it an open one. There are many clever assistants who would have submitted quite creditable schemes, and who would have found (on paper) that the proposed expenditure of 4,500*l*. was more than sufficient to carry out the work in the "best possible manner." It is only when the tenders come in that optimism receives a rude awakening!

NON-COMPETITOR.

The Student's Column.

NOTES ON PORTLAND CEMENT:

CHAPTER IV.—PHYSICAL PROPERTIES AND DETERMINATION.

ALTHOUGH the testing of cement has been engaging the attention of chemists, engineers, and manufacturers for many years, as yet no entirely satisfactory system has been proposed which will eliminate the personal equation of those who make the tests, a variation which renders the results inaccurate. On account of this personal error the endeavour should be to obtain apparatus and appliances to reduce it to a minimum.

Smeaton, in trying to determine the value of cements, placed balls made of them in water, thus showing their hydraulic properties.

Vicat devised an apparatus to measure the amount of penetration of a needle into a mass of the gauged cement, the amount of penetration being proportional to the hardness. A modification of this apparatus is now used to determine the setting time. A common early method of testing the cementitious value was to stick bricks together with the cement under examination, one at a time projecting horizontally from a wall. The cement which held the greatest number of bricks was considered the best. In this test no distinction was made between quick and slow setting cement, so that the former was adjudged superior. In 1830, six years after Aspdin took out letters patent for his Portland cement, Pasley, from his experiments, endeavoured "to lay down rules for judging the quality of cement offered for sale, and for ascertaining whether it has been adulterated or not, by attending to which the most inexperienced person may easily detect such frauds in twenty-four hours or less." Considering our present difficulties in cement testing, Pasley's statement, "that rules have been laid down by which their comparative strength may be judged of experimentally and in a short space of time, such as ten days, with very little trouble and the greatest accuracy," is very amusing. Pasley's method of testing the strength of mortars was to stick two bricks together with them, and, after allowing a certain time for hardening, he suspended them from a tripod, a pair of clamps fixed on the upper brick and a similar pair on the lower one, and, attaching weights thereto, noted the weight required to pull the bricks apart. He also ascertained the time required for cement to harden under water.

In 1858 John Grant, Engineer for the London Metropolitan Board of Works, began his well-known tests for Portland cement. He was the first to introduce definite methods, and he devised a machine for testing tensile strength. Later, Faija showed the importance of testing the soundness of cement, and devised an apparatus for the purpose. Michaelis devised a short-lever machine; Faija also introduced a similar one. The development of methods of testing came slowly after Grant set the pace and Michaelis and Faija had improved and extended them.

Different committees and associations formulated rules, which served their purposes for the time, but, with the more general use of cement and the introduction of specifications, new methods had to be introduced and old ones improved on. A great deal of work has been done in this way by the German Association of Cement Makers, by the commission appointed by the French Government in 1891, and by the various conferences of the international association for testing materials. With this short *résumé* of the development of cement testing, it is proposed to consider the different tests and methods now in use in detail. As the majority of cement tests are made by mixing the sample under examination with water, and moulding into briquettes, blocks, pats, etc., it would be well to consider first of what consistency the paste for these should be, for on this depends the results obtained.

The paste should be of a normal or standard consistency, but, as nearly every operator has a different idea of what a stiff plastic paste should be, this consistency varies greatly.

At the Charlottenburg testing laboratories the percentage of water to be used is obtained by mixing the sample to a syrupy paste, so that it will run from a spatula in long thin threads without forming lumps. Representing the quantity of water to produce this condition by N, then the percentage of water W required for normal consistency is obtained by the equations $W = \frac{N + 1}{2}$ for neat tests, and $W = \frac{N + 3}{4}$ for sand tests (three parts sand, one cement). This gives a suitable paste for use with the Boehme Hammer apparatus, and is nearly of the same consistency as is the most general practice in this country. Another method in use in Germany is to make a paste to fill the mould of Vicat's needle apparatus, replacing the needle with a rod 1 c.m. in diameter, and weighted with 300 grammes. The penetration of the rod to a certain point gives the percentage of water required.

Some testers, again, prefer to use the minimum quantity of water—that is, just sufficient that, after beating the cement paste into the moulds, enough moisture rises to the surface to enable the cast to be faced with a trowel or spatula. In America the general practice is to mix rather wet, so the paste can be kneaded with the hands. Although none of the methods are entirely satisfactory, that as practised at the Charlottenburg laboratories might be universally adopted, as, when carried out in a proper manner, the most uniform results can be obtained. Numerous mechanical contrivances have been devised for mixing the cement into the required paste, but the objections to them all are that the cement tends to ball and it is difficult to tell when the mixing is complete; while quick-setting cements often begin to set during the mixing. In hand gauging the operation is fully under control, and the experienced operator can tell by the appearance of the paste when the mixing is completed. The author finds a very thorough mixing can be done in a large porcelain mortar, using care not to grind the cement particles. The mixing should always be done on some non-absorbing, non-corrosive surface, such as plate-glass, slate, or marble, otherwise water will be absorbed from the paste, rendering it drier than intended, and so materially affecting the results. The cement or mortar should be thoroughly mixed till the water is distributed evenly through the particles. In Germany the custom is to mix slow-setting cement three minutes and quick-setting one minute, but the experienced operator tells from the appearance when the cement is sufficiently mixed. Should the paste begin to stiffen during the mixing the cement has begun to set, and should be thrown away, making another trial with more water. The addition of water to a paste which has begun to set must not be resorted to, as this would destroy the crystallisation of the cement compounds. Whatever forms the mortar is moulded into, care must be taken to keep them moist during setting, the hardening being a chemical change and entirely dependent on the water used in mixing.

The casts should be preserved in moist air or covered with a damp cloth, keeping it from coming in direct contact with them, otherwise the cloth may dry out and absorb water from the cast. A damp box is the most suitable arrangement, and the temperature can be kept even.

Having worked the cement into a suitable paste, the next step is to determine its various properties. In valuing a cement one of the most important, and in many cases the only test it is subjected to is the determination of its strength. The setting of cement is the change from a fluid to a solid state. When it has set, the process of hardening has commenced.

The relative degree of hardness is measured by determining its compressive, adhesive, or tensile strength.

In this country the compressive test is seldom done; in Germany it is always done along with the test for tensile strength.

For compression tests the specimens are usually 2-in. cubes. The machine in which they are broken should not be of large capacity, since the friction, which increases with the load, has an influence on the results, especially on cubes tested at short periods. Usually the compressive strength is eight to ten times the tensile strength. The chief point requiring attention in testing for compressive strain is that the weight is distributed evenly over the

whole area of the test piece, otherwise, if the strain first comes on one part of the test piece only, it is crushed in detail, and very erroneous results are obtained. To insure an equal distribution of the load, thin pads of soft wood are generally inserted between the machine and test piece.

KING'S COLLEGE, LONDON:
LIST OF PRIZE WINNERS, 1903-4.

DIVISION of Architecture (day school):—History of Architecture—1st division, H. Niemann Smith, silver medal. Studio—1st year, W. Hoyle, 1*l.* in books. Building Construction—2nd year, 1st division, H. Niemann Smith, 1*l.* in books; 1st year, 1st division, W. Hoyle, 1*l.* in books. Faculty of Arts:—Division of Architecture (evening)—1st division, W. H. Judges, 1st prize; W. Fenn, 2nd prize. Sketching Class—S. Ixer, prize. Quantities—Chas. G. Blomfield, 3*l.* in books; Alex. W. Percival, 2*l.* in books; Wm. F. Foster, 1*l.* in books. Constructional Drawing—W. J. Burton, silver medal; C. Winteringham, 3*l.* in books; E. F. Wicks, 2*l.* in books; J. Perkins, 1*l.* in books. Building Construction—Wm. F. Foster, silver medal; A. W. Percival, bronze medal; W. J. Burton, 3*l.* in books; E. A. Townsend, 2*l.* in books. Sir George Faudel Phillips' bronze medal for Sanitary Building Construction—W. H. Judges.

WESTMINSTER CITY COUNCIL.

THE usual meeting of this Council was held on Thursday last week, at the City Hall, Charing Cross-road, W.C.

Holborn to Strand Improvement.—The General Purposes Committee reported that they had caused a representation to be made to the London County Council that, in consequence of the very great loss of rating to the City of Westminster through the large tracts of land at present unoccupied on the route of the above improvement, the County Council should immediately consider such other conditions of agreement for the disposal of such land as would permit the land to be occupied on equitable terms. The action of the Committee was endorsed.

South African War Memorial.—On the recommendation of the same Committee it was agreed to consent to the erection of a memorial to the officers and men of the Royal Artillery who fell in South Africa, in Waterloo-place, opposite the Guards' memorial.

Middlesex Guildhall.—The report of the Works Committee contained a recommendation, which was agreed to, to permit the Middlesex County Council to alter the building-line in Little George-street, at the rear of the Guildhall.

Victoria Station Enlargement.—On the recommendation of the Committee, it was agreed to authorise the City Engineer to issue a licence for the erection of a hoarding on Eccleston Bridge, in connexion with the enlargement of Victoria Station, on the application of Messrs. Mowlem and Co.

Wardour-street Widening.—On the recommendation of the Improvements Committee it was referred to the Law and Parliamentary Committee to consider and report on the advisability of promoting a Bill in Parliament to authorise the Council to carry out the widening of Wardour-street.

COURT OF COMMON COUNCIL.

THE usual fortnightly Court of Common Council was held in the Guildhall, E.C., on Thursday last week.

By-laws with regard to Closets, etc.—The Sanitary Committee submitted a copy of by-laws under the City of London (Various Powers) Act, 1900, with respect to water-closets, earth-closets, ashpits, cesspools, etc. The City Seal was affixed to the copy of the by-laws.

The Removal of the "Obelisk," St. George's-circus.—On the recommendation of the Bridge House Estates Committee, it was agreed to consent to the erection of a clock-tower on the spot now occupied by the Obelisk, St. George's-circus, on condition (among others) that the Southwark Borough Council re-erect the Obelisk on a spot to be hereafter agreed upon.

The Demolition of Buildings in the City.—A letter was received from the Local Government Board enclosing the by-laws made by the Court on March 24 last, sealed and confirmed by the Board.

CHURCH, ROOKHOPE, DURHAM.—The foundation-stone has just been laid of a new parish church for the village of Rookhope. The architects are Messrs. Carrol and Passmore, London, and the builder, Mr. Wm. Hall, of Gateshead.

OBITUARY.

MR. MITCHELL.—We have to announce the death, on July 21, after a long illness, of Mr. W. E. Mitchell, aged forty-four years. Mr. Mitchell was a member of the firm of Messrs. William Henry Mitchell, Son, and Gutteridge, of No. 9, Portland-street, Southampton, architects. Of the more principal works carried out by his firm we may instance the Royal Southampton Yacht Clubhouse, Above Bar, Southampton (Mr. W. H. Mitchell); the Infants' School, Totton, near Southampton; the Board Schools at Eastleigh, Hants; the boiler-house, chimney-shaft, etc., South Stoneham Union Workhouse, at West End; the school buildings in Ludlow-road, Woolston; the decoration, with repairs, improvements, new pulpit, etc., of the Congregational church at Freemantle, Hants; the town hall and offices, with fire-station, stables, men's quarters, etc., for the District Council of Eastleigh, for which they won the first premium in competition; the Crown Hotel, Lyndhurst; Taunton's Trade Schools, Southampton, opened in March, 1899; the workhouse infirmary, for about 300 patients, at Shirley Warren, for the Guardians of the Poor of the Southampton Incorporation (1900-2), Mr. A. F. Gutteridge being, we believe, mainly responsible for the preparation of the plans and designs as architect of the building; drainage and other works at West End, Southampton, for the South Stoneham Board of Guardians; St. John's Mission Hall, in French-street, and the Highfield Hotel, in Church-street, Southampton; the schools in the High-street, Pear Tree Green, for the St. Mary Extra United District School Board, Hants; additions, with new classrooms, etc., to the Hartley University College, Southampton; and the recent improvements, with iron fire escape, staircase, and bridge, and so on, at the Southampton Workhouse for the Guardians.

GENERAL BUILDING NEWS.

ST. PATRICK'S CATHEDRAL, ARMAGH.—The Roman Catholic Cathedral of St. Patrick has just been consecrated by the Papal Legate, Cardinal Vannutelli. St. Patrick's Cathedral stands on a very high eminence at the approach to the City of Armagh. It faces the ancient Cathedral, which also stands on an eminence, and was commenced in the year 1840. The work of rearing the cathedral was continued slowly, and, in the end, with considerable alterations in the original plans. In its completed form the building is cruciform in plan, comprising nave, aisles, and transepts, with chancel and choir. The total length in the clear is 212 ft., the internal length 208 ft., the breadth across the transepts 120 ft. The length of the nave is 114 ft., the length of the chancel 60 ft., and breadth of nave and chancel 75 ft. The transepts are 41 ft. by 34 ft., and the choir is a square of 38 ft. The external roof is 100 ft. in height, the internal one 81 ft. The two western towers and spires rise to a height of 210 ft., and are surmounted by 10-ft. crosses. The crossing of the roof where the transepts intersect the nave is supported by four arches 80 ft. high by nearly 40 ft. wide. The principal entrance is on the west end, comprising a large central doorway and two smaller flanking doorways in the towers. There are also auxiliary doorways in the transepts, a doorway which originally opened under the east window in the chancel wall having been filled up on the erection of the Lady altar. The entrance from the sacristy is in the same chancel wall, between the Lady altar and St. Joseph's altar in the northern aisle. The building has a seven-terraced flight of steps, 225 ft. long, leading from the entrance gates to the piazza that fronts the western doors. In the interior there are some fine mosaic decorations on the walls. The subjects are very diverse, many being Irish themes, such as St. Brigid founding her monastery at Kildare, but Biblical subjects have also been availed of. The great attraction is the crossing where the high altar stands, the six spandrils of which, over high arches, are inlaid with mosaic figured subjects in gold and colour, representing "The Good Shepherd," "The Resurrection," "Christ and Magdalen," and "The Ascension." The one facing towards the nave contains a picture of St. Patrick converting and baptising the Irish. The subjects of the decoration of the ceilings are incidents in the lives of the Irish saints, from St. Patrick to St. Laurence O'Toole. The panels contain pictures of many of the saints, prophets, and patriarchs. For the marble work about thirty different types have been used. The Gothic high altar, which stands against the rood screen in the crossing, is erected in statuary marble. The frontal contains a panel group, after Leonardo da Vinci, by the Roman sculptor, Signor Cesare Aureli. Two years and more Professor Aureli devoted to this work. It is an alto-relievo presentation, in white statuary marble of Carrara, of Leonardo da Vinci's "Last Supper." The pulpit is the work of Signor Medici, of Rome. It stands against the main south-western pier at the crossing. The work is carved and resplendent with inlays of various old marbles. The width of the body of the pulpit is over 6 ft., and the plinths and cornice stones are all got out in solid marble blocks. The plan is octagonal, with angle niches containing figures of the four Evangelists, St. Patrick, and St. Brigid, the canopies above these statues being groined and carved. The panels between the niches are filled with tracery and inlaid marble. The Stations of the Cross take the form of fourteen plaster statuary groups in alto-relievo, resting on semi-circular pediments, springing from the wall level, and ornamented with Gothic foliated tracery and flowers. Behind each group a Gothic arched and moulded panel forms a background, having in its upper portion a small inlet in quatrefoil shape for the reception of the wooden cross necessary for the attachment of the indulgences of the Via Crucis. There are nineteen stained-glass windows. The architect was Mr. C. J. MacCarthy, of Dublin.

RENOVATION OF PETWORTH PARISH CHURCH.—The parish church of St. Mary, Petworth, has been reopened after alteration. After inspection of the building, a report on the fabric was drawn up and prepared by Mr. C. E. Kempe, with whom was associated Mr. Walter E. Tower, architect; and Lord Leconfield undertook to bear the expense of the restoration of the whole of the nave, aisles, and the north chapel, which is dedicated to St. Thomas of Canterbury.

CONGREGATIONAL CHURCH, EPSOM.—The foundation-stones of the new Congregational Church in Church-street, Epsom, were laid recently. The building will accommodate about 500 people, the dimensions of the main building being 80 ft. by 37 ft. The fabric will be of Corsham Down stone with red brick facings, and at the front will be a square tower, with a spire 70 ft. high. There will be a main entrance leading into a vestibule, an entrance beneath the tower, and a side entrance. The flooring will be of wooden block, the seating in Orham wood, and the roof of open timber. There will also be a west end gallery to seat eighty people. Two vestries are provided for at the rear of the chapel. The lighting will be by electricity, and the heating on the low-pressure system. The architects are Messrs. T. Gregg and G. Stapley, and the builders Messrs. Cropley Brothers.

ADDITIONS TO THE GRAMMAR SCHOOL, DRAX, NEAR SELBY.—The foundation-stone was recently laid of the new wing which is being built on to the grammar school at Drax. The work is being carried out from the designs of Mr. Thomas S. Ullathorne, architect, Selby, by Messrs. Jackson and Dunberline, builders, Goole.

ENLARGEMENT OF BURNTWOOD OLD SCHOOLS, STAFFORDSHIRE.—The memorial-stone for the enlargement of the Sunday schools connected with the old schools at Burntwood was laid recently. The new buildings comprise a schoolroom, 57 ft. 6 in. by 25 ft. 6 in., and two classrooms, 18 ft. by 16 ft., giving accommodation for 300 children, in addition to the 150 children provided for in the old schools. The work has been placed in the hands of Mr. Robert Harris, builder and contractor, Shelfield. The new buildings have been designed by Mr. H. E. Lavender, architect, Walsall, and are of brick.

WORKHOUSE EXTENSIONS, YORK.—At a meeting of the York Board of Guardians on the 21st ult., Mr. Snaith moved that sanction be given to the proposal of the Building Committee to erect a new tramp ward and nurse quarters, and the motion was ultimately carried. It was resolved that Mr. J. H. Morton, architect, South Shields, be appointed to carry out the work.

CONSERVATIVE CLUB, SUTTON-IN-ASHFIELD.—The memorial-stone was recently laid at Sutton-in-Ashfield of a new Conservative club, on a site centrally situated in Portland-square. Mr. F. P. Cook, of Mansfield, is the architect of the new premises, and the contract has been secured by Mr. J. Greenwood, of Mansfield, the estimated cost being 1,500*l.* The building will be of brick, with Ibstock facings and stone dressings. The main entrance will face Forest-street, and on the ground floor there will be the billiard-room, with accommodation for two tables, a smoke-room 14 ft. by 13 ft., and serving bar, with direct communication to the billiard-room. The club-room upstairs will be 42 ft. by 28 ft. Accommodation for a caretaker will also be provided.

FIRE STATION, ARDOYNE.—The new branch fire station, which has been erected at Ardoyne, by the Council of the County Borough of Belfast, was opened on the 27th ult. The building is Georgian in style,

and the outer elevations are in red brick, relieved with white Scotch sandstone dressings. The interior walls throughout are of bricks, plastered with cement dado. The roofs are covered with Welsh Countess slates. The contractors for the building were as follows:—Mr. Hutcheson Keith, builder; Messrs. James Louden and Co., plumbers and gasfitters; Mr. Stanley Johnston, electrician; Messrs. Musgrave and Co., Ltd., stable fittings; Mr. Thomas Foy, automatic door fittings; and Messrs. Young and Mackenzie, architects.

THE ROWTON HOUSE, DOG BANK, NEWCASTLE-ON-TYNE.—It is proposed to erect this building in Dog Bank, at the foot of Pilgrim-street. The plans have been passed by the Town Improvement Committee, and the scheme has the approval and support of the Corporation. The plans have been prepared by the architect, Mr. J. C. Maxwell. The building has a frontage of 162 ft. on the Dog Bank, sloping to the east, and a mean height of 74 ft.

BANK PREMISES, BRISTOL.—The new premises of the London and Provincial Bank, Ltd., No. 3, Clare-street, were opened on the 2nd inst. The building is of Doulting stone, with polished granite base, and is in the later Renaissance style. Messrs. Oatley and Lawrence were the architects, Messrs. R. Wilkins and Sons being the contractors, and the carving was done by Mr. Gilbert Seale, London.

MINERS' HOMES, BACKWORTH, NORTHUMBERLAND.—The chief corner-stones for the seventh colony of cottages in connexion with the Northumberland Aged Mine-Workers' Homes Association were laid recently at the West Allotment, near Backworth. The cottages are being built by Mr. G. Burdis, contractor, Gosforth, from the plans of Mr. T. Tulip, Choppington.

THEATRE, LIVERPOOL.—The Queen's Theatre, Paradise-street, Liverpool, has just been opened. From floor to ceiling the house has been reconstructed. Seating accommodation is provided for 2,000 people within view of the stage. Eight boxes on the stalls and circle level each accommodate six persons. The stage, 27 ft. wide, 26 ft. high, and 53 ft. long, has been reconstructed, and fitted with a fireproof curtain. Mr. J. H. Havelock Sutton was the architect engaged, the builders being Messrs. Holme and Green.

APPOINTMENTS.

KING'S COLLEGE.—Mr. Arthur Stratton has been appointed lecturer in the Architectural Division of King's College, London, in succession to Mr. C. H. Reilly, and Mr. Ronald P. Jones has been appointed assistant lecturer to Mr. Stratton.

SANITARY AND ENGINEERING NEWS.

GOSPORT AND ALVERSTOKE MAIN DRAINAGE.—Gosport and Alverstoke are situated on the western side of Portsmouth Harbour. The whole district comprised in the area to be drained is very flat, the greatest difference of level being 22 ft. The difficulty of draining the district is increased by its peculiar conformation, there being no less than four creeks which penetrate the district—viz., Forton Lake, Haslar Lake, Workhouse Lake, and Stoke Lake; therefore, before considering the general details of the scheme to be adopted, it was first necessary to consider how and where the sewage should be dealt with—viz., whether the creeks should be used as outfalls, or whether there should be one main outfall into the sea. The creeks are left dry at low water, exposing a large surface of mud, which, owing to the sewage at the present time being discharged into the creeks, is in a very offensive state. The lowest portions of the district are on the borders of these creeks, and are separated from each other by intervening ground at a higher level. A sea outfall was selected for the following reasons:—A higher state of purity in the effluent would be required if discharged into the harbour than would be necessary if discharged into the open sea. Furthermore, the creeks being left dry at low water, the outfall sewers would have to be taken to the mouths of the creeks. The iron sewers required to carry the effluents to low water would cost a very large sum. A septic tank would be required for each of the four outfalls. Furthermore, the land required for each of the four tanks would be very difficult and costly to obtain. After examining the shore, the deep-water channels, and set of the tides, the point selected for the outfall is near the western boundary of the district. The flatness and low-lying nature of the district to be drained, rendered a pumping scheme necessary, but the waterlogged nature of the ground rendered the deep sewers necessary for a central pumping station impossible. The present population is between 27,000 and 30,000: the prospective population is taken at 40,000. The volume to be dealt with is as follows:—From rainfall, 630 cu. ft. per min.; from sewage (twice the average flow), 267 cu. ft. per min.; total to be dealt with in tanks, 897 cu. ft. per min.—say 900 c.f.m., ·0225 c.f.m. per person, 202½ gallons per day per person. The pumps for lifting the sewage at the eighteen different points are Shone's ejectors, in duplicate, at each station, supplied with air from air compressors in duplicate at a central station in Westfield-road. The sewage is treated in septic tanks before being discharged into the sea, but there are no contact beds, as the effluent is discharged into the sea. Briefly, the works consist of, for the district:—26 miles of sewers varying in size from 6 in. diameter to 3 ft. diameter; thirteen ejector stations varying in size from 50 gallons to 800 gallons; 3½ miles of rising mains; 7½ miles of air mains; a tank 300 ft. by 75 ft.; two 180 h.-p. air compressors. On Government property there are five ejector stations. The whole of the works have been carried out under the supervision of Mr. R. St. George Moore, M.Inst.C.E., of Victoria-street, Westminster, assisted by Mr. Herbert Frost, M.I.M. and C.E. The contractors for the general works being Messrs. B. Cooke and Co., of Westminster, and for the machinery, Messrs. Hughes and Lancaster, of Westminster.

MISCELLANEOUS.

NATIONAL REGISTRATION OF PLUMBERS.—A conference of representatives of the six District Councils for the National Registration of Plumbers in Scotland was held recently in Glasgow. The meeting was convened by the Glasgow and West of Scotland District Council, which took the opportunity of the assemblage of the Sanitary Institute in Glasgow to bring together the representatives of the Scottish councils, some of whom were members of the Institute, for the consideration of various matters connected with the registration movement, including the existing facilities for the education of the young plumber in the theory and practice of his art, the conditions at present prevailing for admission of qualified masters and operatives to the list of registered plumbers, the prospect of Parliamentary legislation, and other matters. Ex-Bailie James Dick presided. On the subject of education, general admiration was expressed at the arrangements which have been made in Glasgow with the Governors of the Technical College, where, under the supervision of the Scottish Education Department, the theoretical and practical plumbing classes are now under the management of a committee reporting to the Governors, but containing a full representation of the District Registration Council and the plumbing trade. It has further been arranged that the College authorities should hold an examination, which has been approved by the Scottish Education Department, the District Council, and the Worshipful Company of Plumbers, and the last-mentioned body has seen its way to accept the results of that examination as equivalent to its own. A full interchange of opinion on topics of importance to the movement took place, and, at the conclusion of the conference, Ex-Bailie Crawford reported on the steady and persistent efforts which have been made in promoting the Plumbers' Registration Bill, and the very large amount of Parliamentary support which has been obtained from all quarters. The Bill had more than once passed its second reading in the Commons, and had once passed through all its stages in the Lords; but the excessive difficulty of passing private members' Bills was the chief cause of the disappointing delay in obtaining an Act. On the motion of Mr. James Hyslop, Dumfries, seconded by Dr. Crawford, the conference agreed to place on record its sense of the value of the registration movement and of its advantages to the trade.

VISIT OF PLUMBERS TO LONDON.—A party of Dusseldorf master plumbers recently visited the metropolis, and devoted a day to craft matters. The arrangements were made by the London Society of Associated Master Plumbers. The new buildings of the Royal London Friendly Society, in Finsbury-square, were first visited, where there was an exhibition of British workmanship. Luncheon followed, at which the London representatives were the guests of their German friends. After luncheon, the Guildhall was visited. Having been conducted through the museum, the great hall, and the Council chambers, the party journeyed to Parke's Museum, and here the various sanitary exhibits were studied. Next the Polytechnic was visited, and, to conclude the programme, the Dusseldorf masters were entertained to luncheon by the London Society. The Dusseldorf masters have resolved to form an institution in their own country based on the organisation of master plumbers in this country. Messrs. J. J. Rawlings, R. A. Marshall, J. Johnson, and J. Wright Clark conducted the party on behalf of the London Society.

DEVONSHIRE-STREET, W.—A memorial-tablet has been affixed against the front of No. 56, Devonshire-street, Portland-place, being the house occupied by Sir John Herschel in 1824-7.

FREE LIBRARIES, LONDON.—It is stated that Mr. Andrew Carnegie has offered a sum of 7,000*l.* to the Mayor and Borough Council of Southwark to defray the cost of erecting a public library in St. George's Ward, on the site at the corner of the Old and New Kent roads, which has been given by Lord Llangattock and his son, the Hon. J. M. Rolls. At their meeting on Friday, July 29, the Borough Council of Islington passed, by thirty-six votes to seventeen, a resolution for the adoption of the Free Libraries Acts without a limit of the rate to ½d. It was announced at the meeting that Mr. Carnegie would undertake to defray the cost of the buildings provided the Council would find the site and would levy a 1d. rate.

WAR MEMORIAL, ISLINGTON.—A memorial statue in bronze will be executed by Mr. McKelland to commemorate the ninety-one inhabitants of the borough who fell in the South African campaign. The statue, a female figure symbolical of victory, will follow a design recommended for adoption by Sir E. J. Poynter, P.R.A., and Sir W. Richmond, R.A., and will be erected in Highbury Fields, at a cost of about 800*l.*

RAMSEY ISLAND, SOUTH WALES.—The Ecclesiastical Commissioners have just sold to Mr. Wynford Philipps, M.P. for Pembrokeshire, the island of Ramsey, together with the chapel of St. Justinian on the opposite seacoast. The chapel forms one of several in that part of the county which formed the resort of missionaries and pilgrims in olden days. Its erection is ascribed to Bishop Edward Vaughan (1505-23), who built the chapel, on the east side of the chancel of St. David's Cathedral, wherein he was buried. Ramsey Island has been somewhat fancifully termed the "Iona of Wales," by reason of its ancient association with the church founded by St. David in the VIth century.

SWEDISH GRANITE.—Mr. Schele, British Vice-Consul at Halmstad, writes that about 30 per cent. of the entire export of granite from that district has been latterly shipped to the United Kingdom. The price obtained this year is no less than 8s. per ton below that of two years ago. This has caused a severely felt loss to producers, but now, since the price of labour has been considerably reduced and improved methods of manufacture introduced, it is hoped that this export, which is so important both to the port and district, may be maintained and further increased. The local quarrying company having purchased a German patent for shaping granite, a new article for street-paving purposes will be placed on the market for export from Halmstad and from the Lysek district. The paving sets turned out by these machines are of a smaller size than the ordinary ones, and are specially suitable for streets and road work; their cost and manufacture is about one-third of the manufacture of ordinary paving stones.

THE ABBOT'S HOUSE AT ARBROATH.—Negotiations have been opened between the Arbroath Town Council and H.M. Board of Works for Scotland for the transference from the former to the latter, under the Ancient Monuments Preservation Acts, of the ruins of the Abbot's House, adjoining Arbroath Abbey ruins. Abbot's House is said to be one of the oldest inhabited buildings in Scotland, and King Robert the Bruce and other Scottish monarchs were occasionally entertained there. The basement or sunk floor is the kitchen of the house, and remains just as it was centuries ago, untouched. The masonry is described as being very fine. The wine-cellars are also on the basement floor. The proposed transference has been brought before the Town Council, and its discussion adjourned pending a conference with the representatives of the Crown.

FIRE TESTS OF THE BRITISH FIRE PREVENTION COMMITTEE.—On Thursday last week the British Fire Prevention Committee had a series of testing operations on their Porchester-road testing ground. The tests were attended by Major-General Festing, on behalf of the Council, and several members of the executive, together with a number of public officials from the Government departments, the London County Council and other corporate bodies, the insurance companies, and the fire service. The first test was with a plastic partition under 2½ in. thick constructed by Messrs. Knechtel. The fire was of one and a half hours' duration, the temperatures reaching 1,800 deg. F., and water being applied for two minutes. This was a test for the "Partially Protective" class, under the new International Standards of Fire Tests. The partition was the first of its kind to attempt this standard. The second test was with a partition 3 in. thick constructed of a pumice product by Messrs. Cullum. The fire

was for a period of two hours, at temperatures reaching up to 2,000 deg. F., followed by the application of water. This was also for the "Partially Protective" class, under the new International Standards, the extra thickness over 2½ in. being met by the additional time during which the partition was subjected to the test. To attain the "Fully Protective" class, a partition must be under test for two and a half hours if under 2½ in. in thickness, or four hours under test if over that thickness. The third test was with sprinklers by the Albion Sprinkler Company, and comprised a systematic series of full-sized and laboratory tests with sprinklers, both dry and wet, relating more particularly to their sensitiveness and their powers of water distribution. The fourth test was with vapour lamps by Petrolite, Ltd. These were lamps in which the vapour is produced from petrol. The tests were mainly in respect to ignition and explosion when upset, broken, etc.

THE PULPITS OF WESTMINSTER ABBEY.—The marble pulpit, which was shown in the Great Exhibition of 1851, and, until lately, stood in a bay of the nave of the Abbey, has been taken to St. Anne's Cathedral, Belfast. It was carved by Wm. Field, after Sir G. G. Scott's designs, and presented in January, 1858, to the Abbey for the Sunday evening services. In its place has been set up the XVIth century pulpit, formerly kept in Henry VII.'s chapel, in which, it is said, Cranmer preached at the coronation and the funeral of his god-son, King Edward VI. That earlier pulpit, constructed of oak, is of what is termed the "wine-glass" shape, having six sides and a slender pedestal. Portions of another pulpit, used in the XVIIth century, have for a long while been stored in the triforium; its successor was removed from the choir in 1827 to the church at Trotterscliffe, near Maidstone, and to that succeeded another which, having been removed to Shoreham, gave place to the marble one mentioned above.

Legal.

CLAIMS FOR REMUNERATION:

HERRELL AND TAYLOR *v.* AINSCOUGH; MATEAR *v.* AINSCOUGH.

THESE actions were tried together. The plaintiffs in the first are quantity surveyors, and the plaintiff in the second, Mr. Huon Arthur Matear, is an architect, practising in Liverpool. Both claims were for professional fees and costs on account of work done. Mr. Horridge, K.C., and Mr. Greer were for the plaintiffs, and Mr. Pickford, K.C., and Mr. Keogh for the defendants. It was stated by Mr. Horridge, in opening, that Mr. John Ainscough, who is a miller in a large way of business at Burscough, decided in 1902 to build at that place a residence to cost, including furniture, about 10,000*l*. Mr. Ainscough at that time lived at Southport. He consulted Messrs. Waring and Gillow, through whom the preparation of the plans was entrusted to Mr. Matear, who is architect of the Assize Courts at York, of the new Liverpool Cotton Exchange, and other buildings. The house at Burscough was to be a first-class gentleman's residence, with a great deal of oak-work about it. Mr. Matear took the matter up, and, as the furniture and fittings were to cost some 2,000*l*., prepared the plans, about which, as this was to be an artistic piece of work, there was a great deal of detail. Some difficulty, however, arose as to the cost. One part of the defence, said counsel, was that Mr. Matear was told to prepare plans for a house to cost 5,000*l*., but that, it was now suggested, was an afterthought, because from the correspondence and interviews the idea formed of the cost of the building was roughly 8,000*l*. To get a close idea of the cost Messrs. Hurrell and Taylor were engaged to take out the quantities, and this was done. Afterwards Messrs. Waring, as contractors, sent in on the basis of the quantities an estimate for building amounting to 7,114*l*. However, Mr. Ainscough, in a subsequent interview with the building manager of the contractors, said that, as he had lost money on the corn market, he would like the plans modified so as to reduce the cost to 5,000*l*. This was done, and the estimate was cut down to 5,500*l*. In June Mr. Ainscough intimated that he had decided not to build, and the business, having gone off, the architect and the quantity surveyors brought these actions to recover their fees, which were, in each instance, 2½ per cent. on the first estimate of cost. The defendant declined to pay, on the ground that, as the matter had fallen through, he was not liable for percentage charges. Mr. Matear, in his evidence, said 2½ per cent. was the usual charge for drawing the plans of a building of this class.

The hearing was adjourned, and the parties subsequently agreed to accept judgment for Mr. Matear for 105*l*. and costs, and for Messrs. Hurrell and Taylor for 100*l*. and costs.

CIVIL ENGINEER'S ACTION FOR FEES.

THE case of Robinson *v.* Cadogan came before Mr. Justice Lawrance, sitting without a jury, in the King's Bench Division on the 1st and 2nd inst.—an action by Professor Henry Robinson, civil engineer, to recover 401*l*. for professional services alleged to have been rendered to the defendant, Earl Cadogan, in advising him with respect to his opposition to a certain sewage scheme.

The defence was that the charges, which included 10*l*. 10s. a day for twenty-seven and a half days, for the plaintiff's own services, in addition to charges for his assistants, were excessive and unreasonable.

Mr. C. A. Russell, K.C., and Mr. F. Newbolt appeared for the plaintiff, and Mr. Lawson Walton, K.C., and Mr. J. R. Atkin for the defendant.

Mr. Russell, in opening the case, said that the defendant was the principal landowner in the neighbourhood of Westoe, near Bury St. Edmund's. In 1903 the Corporation of Bury St. Edmund's were about to apply to the Local Government Board for a loan to enable them to carry out certain works in connexion with a sewage farm they possessed. That sewage farm had been a nuisance to the neighbouring landowners, and it was important to them that the Corporation scheme should be adequate and efficient. Defendant accordingly was anxious to have advice in the matter to enable him to determine whether he should oppose the scheme or not, and for that purpose he retained the services of the plaintiff. With regard to the defence, the learned counsel submitted that it was impossible for a man like the plaintiff to take up the position of critic without being prepared to suggest a better method of dealing with the sewage. As to the amount of the charges, the learned counsel submitted that, if the defendant employed a gentleman of high standing, like the plaintiff, he must pay the plaintiff's usual and proper fees.

The plaintiff, examined, said he spent the time charged for in preparing his report. His charges were quite usual and recognised for persons in his position.

Cross-examined,

He had formed the opinion that the first scheme was sufficient, but the alternative scheme would be more perfect. His item charges for the report amounted to between 70*l*. and 80*l*. only, but the usual fee would have been 100 guineas.

Mr. Charles Hawksley, past-President of the Institution of Civil Engineers, and Mr. J. C. Mellis, M.I.C.E., gave evidence to the effect that the plaintiff's charges were reasonable and proper in the circumstances.

The evidence of Mr. Geo. Strachan for the defendant was interposed at this point. He said he had been Engineer to the Borough of Chelsea, and was called in to advise the Borough of Bury St. Edmund's as to the sewage scheme. He advised a mechanical scheme, costing about 8,000*l*., and if this was not sufficient, then, in addition, a bacteriological scheme, costing an extra 13,000*l*. There was no difference of opinion between himself and the plaintiff, except as to whether the whole thing should be carried out as one scheme.

Mr. Keith Robinson, the plaintiff's son and his chief assistant, gave evidence as to the time spent on the work. His time, he said, was charged at 2*l*. 2s. per day of seven hours.

This being the plaintiff's case,

Mr. Walton, on behalf of the defendant, submitted that the claim had arisen out of a misapprehension on the part of the plaintiff as to the work he was engaged to do. The plaintiff was only asked to come to a conclusion as to whether the scheme of the Bury Corporation would be satisfactory. The plaintiff reported that Mr. Strachan's complete bacteriological scheme was satisfactory, and when the plaintiff had done that he had done all that the defendant required. But the plaintiff went further, and suggested an improvement of his own, and the whole of the account relating to the alternative scheme ought to be struck out. The learned counsel said that, with regard to the plaintiff's report, it would be straining the scale of professional remuneration to put it at 100 guineas.

Lord Cadogan gave evidence to the effect that he did not ask anyone to prepare a special scheme.

Cross-examined,

He directed no inquiries as to what plaintiff's charges would be, as he trusted that a gentleman in the plaintiff's position would charge proper fees.

Mr. M. W. Mortimer, defendant's agent at Culford, said he had not given plaintiff instructions to prepare an alternative scheme.

Sir A. Binnie, Engineer to the London County Council, stated that he did not think, in the circumstances, it would be usual to prepare an alternative scheme.

This evidence concluding the defendant's case, counsel addressed his lordship, and, in the result, judgment was reserved.

THE ACTON ANCIENT LIGHT DISPUTE:

MANDATORY INJUNCTION GRANTED.

IN the Chancery Division, on the 2nd inst., Mr. Justice Kekewich delivered judgment in the case of Kine *v.* Jolly, the action by Mrs. Kine, the owner of a house, known as "Woodthorpe," in Acacia-road, Acton, against Dr. Jolly, the owner of an adjoining house, claiming a mandatory injunction, or, in the alternative, damages for the obstruction of her ancient lights.

The facts of the case and the evidence were fully reported in the issues of the *Builder* of July 23 and 30 last.

His lordship, in giving judgment, said that the first question was, whether the plaintiff had a cause of action. That question had to be considered on the lines of the recent decision in the House of Lords in the case of the Home and Colonial Stores *v.* Colls, which laid down a rule admittedly difficult of application, but, in itself, comparatively simple. The Lord Chancellor had said that the question in each case was, whether the obstruction of light amounted to a nuisance which would give a right of action, and Lord Lindley said that the question to be decided was not how much light was left, but whether the plaintiff had been deprived of so much light as to constitute an actionable nuisance. In the present case, that there had been an obstruction of light, sufficient to be felt, was clear and beyond dispute, and that was not contested. But the question was, was it such as to constitute a nuisance, and such as caused a material privation of light for practical purposes for business or occupation, and upon this depended plaintiff's right to manitain the action. At the first trial he was convinced that there had been interference by the defendant's building with the light of the plaintiff's drawing-room, and he now thought, although it still remained a well-lighted room, there was some obstruction. He saw no reason now to alter that opinion, but, in accordance with the rule laid down by the House of Lords, he could not deem the obstruction of light to that room to be actionable, and he decided that, taking that room alone, the plaintiff had no cause of action. At the second trial there was put in a new question—viz., whether there had been an actionable obstruction of the light coming to the plaintiff's hall by reason of the defendant's building. The evidence was clear that this part of the plaintiff's house had a considerable amount of light, and, taken alone, he could not regard the obstruction as a nuisance within the meaning of the judgment in the House of Lords. The great cause of complaint was as to the obstruction of light to what had been called the morning-room in the plaintiff's house. It was, before the erection of the defendant's house, an exceptionally well-lighted room, and even now was well lighted. The question was whether there was sufficient light left to enable the room to be used for the ordinary purposes of a room of that character? The evidence was that, in houses like the plaintiff's, being a suburban or country residence, the third room on the ground floor, not being the dining-room or drawing-room, was the most used. For the complete enjoyment of such a room good light was essential. That there had been a large obstruction of the light coming to that room by the erection of the defendant's house was abundantly clear, and he thought it was clear that there had been a large interference with the comfort of that room. There had been a considerable body of evidence as to the altered character of that room by reason of the erection of the defendant's house. He was convinced that the character of that room had been altered, and, although it was still a well-lighted room, it had lost, by the obstruction of light, one of its chief charms and advantages. Having given the evidence and all the circumstances full consideration, he had come to the conclusion that the obstruction of the light to the plaintiff's morning-room was a nuisance within the meaning of the authorities on that subject. The plaintiff, therefore, had a cause of action, and the question then was as to what form the relief should take. The plaintiff said that a mandatory injunction should be granted, and that damages would be inadequate for the injury she had suffered. In that his lordship agreed. There was no reason why the court should incline to damages rather than to an injunction. Under these circumstances he thought it his duty to grant a mandatory injunction, and the next point was as to what should be its form or extent. It was argued, on behalf of the plaintiff, that he must regard the nuisance to her house as a whole. He considered that

he must treat the obstruction as to the morning-room, plus the obstruction of light to the hall. He proposed to order the defendant to pull down so much of his house as caused a nuisance to the plaintiff by the obstruction of the light to the windows of the morning-room and the hall, as the same existed previous to the erection of the defendant's house. The defendant must pay the costs of the trial. His lordship said he desired to make these further remarks. The first was that he supposed the defendant might wish to take the opinion of the Court of Appeal on the matter. If he did, full opportunity for this should be given. To enable this to be done he thought the best course was, not to suspend the operation of the injunction, but to intimate, as he did, that no application to enforce the order would be regarded as proper so long as an appeal from his decision, presented with reasonable diligence, was pending. Should the defendant appeal, he suggested that the plaintiff's solicitors should not at present tax their costs; but if they did they must give the usual undertaking to return the costs paid by the defendant if his appeal succeeded. His lordship said, in conclusion, he wished to offer this advice both to the plaintiff and the defendant. He had said that, in his opinion, damages were not an adequate remedy for the injury the plaintiff had suffered. They were, however, a partial remedy, and he thought the plaintiff would be well advised, if the defendant offered it, to accept a substantial sum as compensation, and so put an end to the expenses of further litigation.

On Wednesday, the 3rd inst., Mr. Hughes, K.C., mentioned the case to the Court of Appeal, composed of Lords Justices Vaughan Williams, Romer, and Cozens-Hardy. The learned counsel said that he appeared for the defendant, and the previous day Mr. Justice Kekewich had granted the plaintiff a mandatory injunction. The case had previously been before this court, when he (Mr. Hughes) appeared for the defendant, Dr. Jolly. When the appeal was opened, his learned friend, Mr. Lawrence, who had represented the plaintiff in the court below, said that, having regard to the decision of the House of Lords in the case of the Home and Colonial Stores *v.* Colls, he could not support the judgment as it then was. It was said that Mr. Justice Kekewich had really misdirected himself. Their lordships then took the view that the matter must go back to Mr. Justice Kekewich for re-trial, and reserved the question of costs. The matter had now been back to the learned judge, and he had, as before stated, granted the plaintiff a mandatory injunction. Their lordships, when the case was last before this court, had stated that, if possible, the matter should be again brought before them during the present sittings in order that it might be disposed of while the court was constituted as at the present moment. The defendant not only desired to appeal from the original order, but also from the judgment delivered on Tuesday, granting the plaintiff a mandatory injunction.

Lord Justice Romer said that the defendant could only appeal from the final decision.

Mr. Hughes supposed that would be so, as the original judgment of Mr. Justice Kekewich was discharged, the Court of Appeal reserving the question of costs.

Lord Justice Romer: You must appeal in the usual way. There is no reason why the appeal should be advanced.

Mr. Hughes: If your lordships think that the appeal should take its ordinary course, so be it.

SWINDON ANCIENT LIGHT DISPUTE.

THE hearing of the case of Cook *v.* Wm. McIlroy, Ltd., concluded before Mr. Justice Warrington, in the Chancery Division on the 28th ult., an action by the plaintiff, Mr. E. J. Cook, a pastrycook and confectioner, of Regent-street, Swindon, against the defendants, drapers, of Havelock-street, Swindon, for a mandatory injunction to restrain the obstruction of plaintiff's ancient lights. There was also an alternative claim for damages.

Mr. Norton, K.C., and Mr. Church appeared for the plaintiff, and Mr. Rowden, K.C., and Mr. G. Lawrence for the defendants.

Mr. Norton, in opening the case, said that the plaintiff claimed a mandatory injunction and damages, and the question was which he was entitled to. The only point at issue was whether or not the defendants' building was a nuisance to the plaintiff by depriving him of the access of the light to which he had been accustomed. Mr. Cook was the freeholder and occupier of Nos. 72 and 73, Regent-street, Swindon, at the corner of Havelock-street and Regent-street, and the premises consisted of a shop facing Regent-street and a lock-up shop, now vacant, with a window facing Havelock-street. There was a dwelling-house over both shops, and that portion in the plaintiff's occupation faced both Regent and Havelock streets. The windows of his sitting-room and a room used as a nursery faced Havelock-street, and it was these rooms which were most injuriously affected. Plaintiff's premises extended 95 ft. down Havelock-street. The windows of the sitting-room and nursery had always been in the same condition and position since the premises were purchased by Mr. Cook's father in 1866. Previous to the erection of the defendants' new building plaintiff enjoyed a considerable amount of sunlight and had a view of nearly a mile. On the opposite corner of Havelock-street and Regent-street, for as long as the plaintiff remembered, there was a grocer's shop and dwelling-house of about the same height as the plaintiff's building. The slope of the roof faced towards his building, and the wall from the pavement up to the eaves was about 17 ft. high. The premises were purchased by the defendants and pulled down by them in the autumn of 1903, and defendants then commenced building operations on the site of the old buildings extending for about 90 ft. along Havelock-street. Plaintiff first complained on April 21, 1904, but at that time the defendants were putting up their building in skeleton; that was merely the iron girder framework, as was the case with modern buildings, so the light was not interfered with very much; but as the defendants began to fill in the brickwork it sensibly diminished the plaintiff's light. On April 30 Mr. Cook again complained, and defendants admitted that what they were doing interfered with his light. On May 4 the plaintiff, finding that the light of his sitting-room, nursery, bakehouse, and workrooms was being interfered with and daily diminished issued a writ for an interim injunction. The matter came before Mr. Justice Buckley on motion, and he directed that the action should be tried at once without pleadings, and giving the defendants liberty to pay 30*l.* into court as damages, with a denial of liability. Plaintiff said it was often impossible to use his sitting-room for office work and book-keeping, as he did before, and the light in his bakehouse and workrooms had been sensibly diminished. The light in the lock-up shop had also been reduced, but he made no claim with regard to that. There was a tower at the corner of defendants' building which further obstructed the light.

The plaintiff was called and generally bore out the opening statements of counsel. He said he bought the premises from his father's trustees about six years ago for 3,000*l.*, and had spent about 400*l.* in improving them and making the corner shop into a lock-up shop.

Cross-examined,

The business was not so good as it was previously, as there was now a good deal of competition. He kept three men, two boys, a domestic servant, and a nurse.

Mrs. Julia D. Cook, wife of plaintiff, stated that since the erection of the defendants' building their sitting-room was absolutely useless for any purpose.

Mr. Ellis Herbert Pritchett, an architect and surveyor of Swindon, examined, said he had made the model which was being used to show the elevations. Defendants' building on every floor projected nearer Regent-street than the old buildings which formerly stood on the site, and it was very much higher. The angle of light to the plaintiff's sitting-room was formerly 60 deg. to 64 deg., now it was only 33 deg. to 37 deg. The diminution was very much the same with regard to the nursery window. In his opinion there was no doubt that plaintiff's premises had been very greatly affected by the erection of the defendants' premises at a distance of 31 ft. 9 in. Plaintiff's sitting-room was very dark at the back, and it now would only get a small proportion of sunlight during the summer and would be very dark in the winter. In his opinion the deprivation of light to the plaintiff's premises was so great as to constitute a nuisance to the plaintiff. It had depreciated the selling value of the plaintiff's property to some extent, which he had not calculated.

Mr. Thomas Bell Silcock, an architect and surveyor, gave it as his opinion that the letting value of the plaintiff's property had been considerably depreciated, the residential portion as much as 50 per cent.

Mr. Chas. Bishop, an auctioneer and surveyor, said that the letting value of the plaintiff's premises had depreciated by the obstruction of light caused by the defendants' building.

Cross-examined,

He did not agree that the erection of the defendants' building had improved the letting value of the plaintiff's premises and of the adjoining property.

At the close of the plaintiff's case Mr. Chatfeild Clarke, architect and surveyor, was called. He said he had inspected the plaintiff's premises. The sitting-room was well lighted and bright enough for all ordinary purposes, and he could read very small print at the back of the room with his back to the window. There was plenty of light coming between the gables and the defendants' building, and the angle of light was not at all bad for town buildings. The bakehouse was also bright enough for all ordinary purposes.

In cross-examination the witness admitted he had not seen the plaintiff's premises before defendants erected their building. He did not think there had been any depreciation in the letting or selling value of the plaintiff's premises owing to the erection of the defendants' building.

Several witnesses were called, who said that the erection of the defendants' building improved the plaintiff's property.

Mr. James Dunham, one of the managing directors of the defendant company, examined, said that the contract price for their building was 15,000*l.*, and the fixtures and fittings another 1,000*l.* In round figures the site cost 6,000*l.*

At the conclusion of the defendants' case Mr. Norton, in reply to his lordship, said Mr. Cook did not want to be unneighbourly, and if his lordship decided in his favour, he would be content with damages, and would not insist upon defendants' building being pulled down.

His lordship remarked that he was glad to hear that, because it relieved him of a difficult question which might have had to be considered on account of the building having been allowed to go on to the condition in which it now stood.

In giving judgment, his lordship said that, when he came to consider the angles of light now existing in comparison with the light which formerly existed, there was no doubt that the loss of light was very considerable indeed, especially with regard to the plaintiff's sitting-room and nursery. What he had really to consider was laid down by the House of Lords in the case of the Home and Colonial Stores *v.* Colls—namely, whether the obstruction complained of was a nuisance, and if, by the erection of the defendants' building, the plaintiff had suffered substantial deprivation of light sufficient to make the occupation of the house uncomfortable and prevent the plaintiff carrying on his business on the premises as beneficially as he had formerly done. As to the sitting-room, it was a small room, lighted by one window with a south-easterly aspect, and it was used by the family as their only sitting-room. The plaintiff also used the room for the keeping of his books, and it was used for meals and so on. Then there was the loss of light to the nursery and bakehouse. His lordship, having referred to the evidence, said he came to the conclusion that, as far as the sitting-room and the nursery were concerned, the effect of the defendants' building had been to render the occupation of the rooms uncomfortable and was sufficient to be regarded as a serious injury to the plaintiff in his occupancy of the house. He held, therefore, that the plaintiff had a good cause of action. He now had to decide what relief the plaintiff was entitled to. If the building had not been erected he thought, under the circumstances of the case, he would have granted an injunction, because he thought there was really an injury, and it was doubtful whether it could be compensated for by money. But the defendants' building was erected to a height of 42 ft. before any complaint was made, and at the date of the issue of the writ it was practically complete. He might have had considerable difficulty if the plaintiff had pressed for an injunction. Plaintiff had, however, said he would not do so, and, that being so, the only question he had to consider was as to what damages he ought to award to the plaintiff for the injury he had suffered. After considering all the evidence, he came to the conclusion that the plaintiff was entitled to 500*l.* damages, and he entered judgment for him for that amount with costs.

Order accordingly.

ACCIDENT THROUGH A DEFECTIVE BALCONY.

THE case of Tredway *v.* Machin came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Stirling and Mathew, on the 29th ult., on the application of the defendant for judgment or new trial on appeal from verdict and judgment at trial before Mr. Justice Grantham and a common jury in the King's Bench Division. The case was reported in the *Builder* of April 2 last.

The action was brought to recover damages for personal injuries sustained by the plaintiff owing to the non-repair of premises let by the defendant to the plaintiff's husband. The defendant, who was tenant of No. 16, Sidmouth-street, W.C., under a repairing lease granted in October, 1902, sublet the first floor unfurnished to the plaintiff's husband in December, 1902, upon a weekly tenancy at 10*s.* 6*d.* a week. On August 8, 1903, the plaintiff stepped out on to a balcony in front of the window of her room, and the balcony gave

way, causing the injuries of which she complained. The plaintiff, in her evidence at the trial, stated that she did not know that the balcony was unsafe, but had pointed out to the defendant that a piece of the cement which covered the stonework of the balcony was defective. She further said that the defendant had to do the repairs to the premises. There was no written agreement between the plaintiff's husband and the defendant, and it appeared from the evidence that the defendant had done repairs to the premises to the extent of 200*l.*, which included the putting right of something wrong with the balcony, to which the plaintiff had called his attention, and that the repairs were inspected and passed by the lessor's surveyor. At the trial the jury awarded plaintiff 150*l.* damages, and judgment was entered accordingly. The defendant now appealed on the grounds that there was no evidence of any contract by the defendant with the plaintiff's husband to do repairs; that he was only liable to his own lessor to do repairs; and that there was no evidence of notice to the defendant of any defective state of the balcony.

At the conclusion of the arguments of counsel, the Master of the Rolls, in giving judgment, said he would assume that there was an obligation to repair on the part of the landlord, but on the cardinal point in the case, the evidence was all one way—viz., that no one suspected the existence of any such defect in the balcony as to render it unsafe. The defendant, being under an obligation to his own lessor to repair, carried out certain repairs in accordance with a specification prepared by the lessor's surveyor. A slight defect in the balcony was pointed out, consisting merely of a want of plaster; but no one knew of the indication of any structural defect. No notice of the defective state of the balcony having been given to the defendant, he thought the application should be allowed, and judgment entered for the defendant.

The Lords Justices concurred.

Mr. A. J. Ashton and Mr. W. G. Clay appeared for the appellant, and Mr. Cannot for the respondent.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

16,053 of 1903.—LOCKERBIE AND WILKINSON, Ltd., and J. M. LOCKERBIE: *Coin-freed and Indicator Locks.*

A coin-freed and indicator lock, by which, after the insertion of the coin, the indicator is operated and the coin slot closed by the action of the outside handle, in combination with a bolt-plate connexion by which, in case of the interior handle having been accidentally operated, the action of bolting the door again reverses the indicator and closes the coin slot.

16,722 of 1903.—A. BROOKER: *A Combined Spirit Level, Plumb, and View Finder for Photographic, Artists', and General Use.*

This consists in the combination, in one portable instrument, suitable for carrying in the pocket, or affixing to cameras and other articles, of a view selector, a horizontal spirit level, and plumb, so constructed that it will test vertical and perpendicular lines.

17,940 of 1903.—M. WEBBER and CLATWORTHY AND CO., LTD.: *Mechanism for Adjusting to and Setting at Variable Angles the Backs of Seats, and the like.*

Back frames for settees, couches, and the like, having the end posts pivotally mounted, and having locking bolts adapted to lock in racks fitted in the end posts, the locking bolts being forced to locking position by springs attached to pivoted arms connected by chains, or the like, to an operating lever, whereby the locking bolts can, at will, be withdrawn from engagement with the racks, thus enabling variation in angle of inclination of the back frame, relocking taking place by rebound of the springs on return of the operating lever.

18,726 of 1903.—G. R. URE and T. MCGROUTHER: *An Adjustable Roof Flange or Nozzle for the Smoke Pipes of Stoves, Ventilating Pipes, and such like.*

An adjustable roof flange, comprising in combination a plate with a dome and a nozzle, said dome having grooves and nozzle projections, the nozzle being fastened to the dome by a bolt-and-shot arrangement, and being provided with a removable ring or washer.

18,910 of 1903.—A. M. LAMBERT: *Partition Walls.*

This invention relates to the construction of partition walls with slabs formed of suitable materials, being comparatively thin in section with relation to the area of the faces of the slab. An essential feature consists in forming the pattern or design upon one or both sides of these slabs, and with them building up a partition wall in such a manner that no further ornamentation is required upon the surface, and by this means a partition wall is formed having ornamental surfaces on both sides, and requiring no additional ornamentation whatever, although, if desired, the whole may be painted, or certain portions may be picked out in the desired colours, or the slabs may be formed in the first instance with a glazed surface in any well-known manner.

19,707 of 1903.—S. EWART: *Baths.*

A sheet-metal bath having pockets or loop holes, and set screws with which said pockets or loop holes are fixed on the bottom of the bath for the purpose of receiving and holding in position the legs of the bath.

20,032 of 1903.—R. CRANE: *Fire Grates and Stoves for Occasional Use as Cooking Ranges.*

A cooking range, consisting of an oven under the fire, with a space between for air and the ash-tray, fire blocks on each side, with slots for the descending flues, also at the back with a slight recess for the shifting plate, and fire bars in front, flue passages, which are inclosed on the outer sides with cast-iron pieces properly framed, and which are also continued under the oven before they ascend the back flue, the entire top surface of the fire being covered with cast-iron in two or more pieces, and the top of the front bars being likewise covered by a removable door.

20,593 of 1903.—W. H. LUTHER: *Roofing, Skylight Windows, Side-Lights, and the like.*

According to this invention the frame is secured round the top, and two sides of the rectangular or other opening cut in the corrugated iron or other roofing or part of the building. Each part or side of the frame would be made of one piece, and be formed of a "double thickness, kneed, projecting, out-flanged shape," and have the inner part "kneed outwards at end as a midfeather," to form one side of a channel, while the outer part would be kneed out parallel with same to form the other side of the channel, and then bent backwards at end and doubled round and secured to the roof. The channel thus formed between the "kneed" parts of ends of plate would have inserted within it a packing of rope, or other fibrous or like material, over which the sheet of glass would be placed.

23,129 of 1903.—W. GALWAY: *Construction of Portable Buildings.*

A portable building, cement, stone, or similar slabs supported at their edges in grooves formed by wood-framed members, in conjunction with external cappings and internal steps fastened to said frame members.

266,876 of 1903.—G. M. SCOTT: *Sash Balancing Devices.*

A combined sash hanger and lock, consisting of a spindle, mounted in a bracket, and carrying a clock spring and a pinion with a circular groove in its side, containing holes adapted to be mounted behind a pulley style of a window and opposite a rack or an adjacent side rail, so that pulling the upper sash down, or raising the lower sash, as the case may be, will wind up the spring, and a spring pin, adapted to pass through the inside window facing, and engage in one of said holes, so as to lock the sash.

1,235 of 1904.—J. WHITE: *Apparatus for Releasing Drop Curtains, and the like.*

An apparatus for releasing drop curtains, and the like, consisting essentially of a bell-crank lever, pivoted to a batten, from which is suspended the curtain or like, by operating which bellcrank lever a pin can be withdrawn from holes in two eyes attached to the batten, and from a hole in a hanger by which the whole is suspended.

6,157 of 1904.—C. NOVAK: *Locks or Latches for Doors, Windows, and the like.*

A right and left handed lock for doors, windows, etc., having a bolt reversible around its longitudinal axis, a gear for regulating the stroke of said bolt, allowing, after being put out of gear, of the bolt being pushed in to the lock case for the purpose of being reversed.

10,535 of 1904.—F. BOHNE: *Means for Locking Folding Doors, and the like.*

A means for automatically locking folding doors and windows, comprising a spring-operated bolt, in the shape of a two-armed lever, rotatable around a horizontal pivot, a tapered or rounded head at each end of the bolt, said heads projecting into the path of the two sides or wings of the door or window, a metal line recess in the upper surface of the top transverse bar of one of the wings for the reception of the larger bolt-head, and a metal plate on the upper surface of the top transverse bar of the second wing for pressing back the second bolt head and turning the bolt accordingly.

12,742 of 1904.—A. HENDEL: *Ventilating Apparatus.*

An automatic ventilator, consisting of separate dampers or light material (mica, or the like), so hung in a frame that, when a current of air in one direction is produced either by difference of temperature or by artificial means, the respective dampers will automatically open outwards, and when a contra current of air is produced, the dampers will automatically close.

12,776 of 1904.—L. PEARCE: *A Holder for Window Sashes.*

A vertical sash holder, consisting of a drop pawl formed with a heel and button piece, and held and pivoted in a casing secured to the window, said pawl being in operative engagement and combination with a ratchet, whereby the window is retained in any position.

12,787 of 1904.—J. POHLENZ: *Casters.*

A caster in which the vertical swivel pin is attached to the lower surface of the socket, and engages or enters a recess in the roller-bearing block in such a manner that the lower surface of said socket and the upper surface of said block make contact with each other.

12,909 of 1904.—P. JAEGER: *Roll Shutters.*

A roller shutter having bands drawn through it, in which these bands are made impervious to the action of weather by their being saturated with a substance, such, for instance, as resin, tallow, or the like, before the roller shutter is made up, which substance has the property of being very fluid under heat, and becoming solid when cold, so that a thin elastic and water impervious coating is formed round the separate fibres of the bands, which prevents the bands altering in length, that is to say, contracting by the absorption of water and stretching on drying.

19,108 of 1903.—J. E. LEACH: *Gulley Traps, and the like.*

This invention relates to certain improvements in the gulley trap, or similar drain trap as described in the specification to Patent No. 17,593 of 1900, and its object is to allow of the cap therein described as forming part of the seal, being removed for the purpose of cleaning out the gulley, or similar vessel, without affording a free passage for sewer gases, or the like. This is accomplished by placing underneath the trap, as described, a "teapot" trap, or the like, either as a separate casting, or as part of the gulley or similar vessel, so that when the cap of the uppermost trap is removed, the gases from the sewer cannot escape, being prevented from doing so by the "teapot" trap.

19,131 of 1903.—S. H. ADAMS: *Manhole and Inspection Covers.*

The use of a lever or levers in combination with a manhole, or other cover, said lever or levers serving to separate the cover from its frame, or to serve as a lock to hold both together.

20,648 of 1903.—P. DUCHEMIN: *Hooks or Supports for Carrying Slates, Plates, or Tiles on Roofs.*

A support for square tiles or slates, consisting of three points of support for the lower point of the tile or slate, formed by a bent wire or strip having a vertical part, the upper part of which forms a spring hook embracing the batten of the roof, its lower end being bent down laterally to form one of the supporting arms, then bent across the front to form the bridge piece, and finally bent up laterally to form the other supporting arm, its end meeting the vertical part.

24,249 of 1903.—A. TOISOUL and E. A. FRADET, L. PIEDEFERT (trading as Toisoul, Fradet, and Cie.): *An Introducer for Crematorium, and other furnaces.*

An introducer for crematorium, and other furnaces, comprising a trolley or waggon, adapted to run on rails, carrying a girder, or pair of girders, considerably overhanging or projecting beyond the front end of the trolley or waggon, by means of levers having hinge or pin connexions to the girder, or girders, and the trolley or waggon on which they are carried, and provided with means for raising and lowering said girder, or girders.

218 of 1904.—C. VON FORELL: *A Process for Manufacturing Cement from Slag.*

A process for manufacturing cement from slag, in which slag, granulated by water, and mixed or not with powdered slag, is submitted to an oxidising flame to just below the point of fusion, whereupon the whole burnt mass is suddenly cooled by a dry process, and finally powdered.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

7,203 of 1904.—C. VON RIMANÓCZY: *Stage Structures for theatres, and other places, for Preventing the Spread of Fire.*

A stage structure for theatres, and other places, characterised by the stage being connected by means of openings provided in the rear wall, and closeable by plates or doors, with suitably-high towers, for the purpose of producing such a strong draught as to cause the products of combustion, in the event of a fire, to be drawn from the stage through the door into the open air.

12,013 of 1904.—T. ZIMMERMANN: *Means for Strengthening Scaffold Boards, Planks, and the like.*

This invention relates to cleats for scaffold boards, planks, and beams, which can be driven into the wood. These cleats are formed of separate S-shaped sheet-metal pieces, which are driven into the wood, so that the bent ends of adjacent pieces hook one within the other.

12,354 of 1904.—J. HASK: *Apparatus for Moistening the Air of Rooms and Enclosed Spaces.*

A humidifier, comprising a pan, a trough, superposed upon said pan, a set of elements of absorbing material, supported upon the edge of said trough, a goose neck formed on each of said elements on the upper part thereof, and adapted to almost touch the bottom of said trough, the lower portion of said elements extending into said pan.

12,518 of 1904.—W. L. WATSON: *Material and Composition to be used for Damp-courses in Building, for Covering Roofs, the Surfaces of Bridges, Viaducts, Arches, Sewers, and the like, for Preventing the Access of Damp to Iron Girders, and the like, for the Insulation of Electrical conductors, and for other purposes of like kind.*

A material for damp-courses used in buildings, consisting in the combination of a continuous layer or sheet of lead, with a coating upon both sides, said coating consisting of a mixture of bitumen, powdered pumice stone, and oil, and outside this mixture a coating of asphaltic felt.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

July 21.—By ROGERS, CHAPMAN, & THOMAS (on the estate).

Hoddesdon, Herts.—The Yewlands estate, ten freehold building sites, including a bungalow residence £2,945

July 22.—By HUSSEY & SON, with HANNAFORD & SON (at Exeter).

North Tawton, Devon.—"Bridge Farm," with "Yellands," 141 a. 0 r. 30 p., f. 1,600
"Yeo Farm," 311 a. 3 r. 24 p., f. 2,825
"Essington Farm," 41 a. 1 r. 35 p., f. 1,675
Various enclosures, 133 a. 2 r. 12 p., f. 5,652
Fourteen freehold cottages 1,135
The manorial rights, comprising fair tolls, pound, chief rents, etc. 130

July 23.—By SPELMANS' (at Norwich).

Brancaster, Norfolk.—"The Manor Farm," 251 a. 1 r. 13 p., f., p. 7,000
Hunstanton-rd., two freehold building plots 125

July 25.—By J. M. & R. BALLS.

Toppesfield, Essex.—"Bradfield's Farm," 136 a. 1 r. 28 p., f., p. 1,270
Cottage and enclosures of land, 44 a. 0 r. 3 p., f. and c. 440
Hempstead, Essex.—"Boreham's Farm," 16 acres, f. 170
"French's Farm," 23 a. 1 r. 2 p., f. 220
Four freehold cottages and 4 a. 1 r. 5 p., y.r. 15*l.* 195

By J. BAKER, COOKE, & STANDEN.

Clerkenwell.—19, Wilmington-sq., u.t. 11¼ yrs., g.r. 8*l.*, e.r. 60*l.* 130
Bounds Green.—High-rd., "Elmswood," and the "Cedars," f., e.r. 145*l.* 1,670
13 to 21 (odd), Maidstone-rd., f., y.r. 190*l.* 2,370
Maidstone-rd., "Osborne Lodge," "Mayfield," and "Margaret Lodge," f., e.r. 114*l.* 965
25a, Maidstone-rd., f., y.r. 35*l.* 750
Maidstone-rd., a piece of building land, area 15,900 ft., f. 200
Wood Green.—Truro-rd. (rear of), a piece of ground, area 9,000 ft., f. 120

By ELLIS & SON.

Barnsbury.—2 and 4, Pulteney-st.; also the "Prince of Brunswick" p.h., area 1,650 ft., f., p. 7,310
Gravesend, Kent.—14, Milton-rd. (s.), f., y.r. 36*l.* 758
52 and 67, Milton-rd., f., e. and y.r. 46*l.* .. 600
Brunswick-rd., f.g.r. 3*l.*, reversion in 30 yrs. 110
Brunswick-rd., "Brunswick Arms" p.h., f.g.r. 45*l.*, reversion in 53¼ yrs. 1,000
Augustine-rd., f.g.r. 18*l.* 15*s.*, reversion in 17½ yrs. 300
Edwin-st., f.g. rents 63*l.*, reversion in 31½ yrs. 1,220
Sheppy-pl., f.g.r. 12*l.*, reversion in 33¾ yrs. 230
Northfleet, Kent.—Old London-rd., the "Huntsman's Inn," etc., f.g.r. 33*l.*, u.t. 37½ yrs., with reversion 790

By FURBERS'.

Sunninghill, Berks.—Freehold building land, 2 a. 2 r. 18 p. 250
Harrow, Middlesex.—28 to 31, Nelson-rd., f., w.r. 62*l.* 8*s.* 670

By HEAPS, SON & REEVE.

Hackney.—52, College-av., f., w.r. 33*l.* 16*s.* 300

By WM. HOUGHTON.

Bromley-by-Bow.—3, Ullin-st., u.t. 61 yrs., g.r. 4*l.* 10*s.*, w.r. 39*l.* £270
Poplar.—7, Howard-st., u.t. 49 yrs., g.r. 3*l.* 5*s.*, w.r. 36*l.* 8*s.* 230
Hornchurch, Essex.—High-st., The Union Iron Foundry, 24,500 ft., f., p. 1,000

By F. JOLLY & JAMES.

Walworth.—103, Westmoreland-rd., u.t. 48 yrs., g.r. 5*l.* 5*s.*, w.r. 46*l.* 16*s.* 300

By G. C. PHILLIPS.

Hawkwell, etc., Essex.—"Belsham's Farm," 80 a. 0 r. 16 p., f. 2,030
Shopland, etc., Essex.—"Butler's Farm," 393 a. 2 r. 13 p., f. 9,050
Sutton, Essex.—Freehold pasture land, 5 a. 2 r. 12 p. 280

By A. PREECE & SON.

Bearsted, Kent.—Roseacre-la., "Roseleigh" and 2 acres, f., p. 525
Dalston.—71, Albion-rd., f., y.r. 34*l.* 585
27, Fassett-sq., u.t. 47 yrs., g.r. 4*l.* 10*s.*, y.r. 34*l.* 275
Barnsbury.—6, Sheen-gr., u.t. 32 yrs., g.r. 6*l.*, y.r. 36*l.* 300
Kentish Town.—4, St. James's-gdns., u.t. 45½ yrs., g.r. 5*l.*, y.r. 32*l.* 285
Hammersmith.—45, Rowan-rd., u.t. 71 yrs., g.r. 4*l.*, y.r. 40*l.* 490
Kennington.—26 and 28, Claylands-rd., y.r. 64*l.*, also i.g rents 40*l.* 12*s.*, u.t. 19 yrs., g.r. 28*l.* 640
Notting Hill.—12, Bangor-st., u.t. 61 yrs., g.r. 5*l.* 5*s.*, y.r. 36*l.* 310

By VERNON & SON.

Chesham Bois, Bucks.—Amersham-rd., six freehold building plots, 5 a. 3 r. 31 p. .. 663
Amersham Common, "Quill Cottage," 2 a. 3 r. 25 p., f. 500
Amersham Common, a freehold cottage and 1 a. 0 r. 23 p. 220
Amersham Common, three building plots, 1 a. 3 r. 30 p., f. 141
Amersham Common, enclosure of land and two building sites, 21 a. 0 r. 33 p., f. 1,450
Amersham Common, etc., five building sites, 3 a. 2 r. 34 p., f. 398
Freehold cottage and 0 a. 2 r. 18 p. 300
Freehold holding, area 4 a. 0 r. 6 p. 575
Four freehold cottages and orchard, area 2 a. 3 r. 33 p. 630

By WEATHERALL & GREEN (at Clacton).

Clacton-on-Sea, Essex.—Marine Parade, a block of freehold building land, 1 a. 2 r. 32 p., f. 1,850

By A. CECIL GRIMWADE (at Hadleigh).

Layham, Suffolk.—Six freehold cottages, brickyard, and 5 a. 2 r. 38 p. 550
Enclosure of meadow, 4 a. 1 r. 1 p., f. ... 245
Raydon, Suffolk.—"Fox Meadow," 13 a. 2 r. 12 p., f. 500
Freehold house, buildings, etc., y.r. 15*l.* 175
"The Valley Farm," 19 a. 2 r. 28 p., f. and c. 515

July 26.—By DAVID BURNETT & CO.

Chingford.—Endlebury-la., "Chisholm Lodge" and ¾ of an acre, f., p. 1,200
Battersea.—Lavender-hill, f.g.r. 29*l.*, reversion in 61 yrs. 820
Basnett-rd., f.g.r. 20*l.*, reversion in 61 yrs. . 505
Manor Park.—130, 132, and 134, Third-av., u.t. 93¼ yrs., g.r. 14*l.* w.r. 68*l.* 18*s.* 180

By CHINNOCK, GALSWORTHY, & CO.

Crondall, Hants.—"Well Manor Farm," 158 a. 1 r. 36 p., f., p. (including the Manor of Well) 1,500
An enclosure of pasture land, 54 a. 3 r. 3 p., f. 550

By C. W. DAVIES & SON.

Harringay.—18, 20, and 22, Mattison-rd., u.t. 88 yrs., g.r. 19*l.* 10*s.*, y.r. 102*l.* 1,010

By FIELD & SONS.

Camberwell.—120, Denmark-hill (s.), u.t. 20½ yrs., g.r. 13*l.* 6*s.* 8*d.*, y.r. 75*l.* 575

By T. D. PEACEY.

Battersea.—24, Savona-st. (s.), f., w.r. 28*l.* 12*s.* 250

A. H. TURNER & CO.

Surbiton, Surrey.—Hook-rd., "Accarsane" and ¼ of an acre, f., p. 1,400

By FREDERICK WARMAN.

Battersea.—141, New-rd., u.t. 39½ yrs., g.r. 2*l.* 10*s.*, w.r. 39*l.* 305
Highbury.—35, Highbury-cres. West, u.t. 81 yrs., g.r. 8*l.* 18*s.* 6*d.*, e.r., 48*l.* 390
Canonbury.—6, Canonbury-st., u.t. 41 yrs., g.r. 7*l.* 10*s.*, y.r. 42*l.* 425
Holloway.—49, Eden-gr., f., w.r. 40*l.* 6*s.* 385
Crouch End.—35, Carysfort-rd., u.t. 93 yrs., g.r. 6*l.* 10*s.*, e.r. 42*l.* 440

By WALTON & LEE (at Penrith).

Watermillock, Cumberland.—"The Gowbarrow Hall Estate," 969a. 0r. 97p., f. 13,500
Catterlen, etc., Cumberland.—"The Catterlen Hall Estate," 238a. 0r. 6p. f. 8,850
"Catterlen Mill," 20a. 3r. 20p., f. 1,040
"School Garth" and "Lady Acre" Enclosures, 2a. 3r. 16p., f. 121
"Mill House" and 1a. 0r. 8p., f., y.r. 8*l.* .. 205

By ORGILL, MARKS, & LAWRENCE (at Masons' Hall Tavern).

Tottenham Court-road.—6 and 7, Francis-st.; also "The Marlborough Arms," p.h., and "Blenheim Mansions" (shops and flats), u.t. 75 yrs., g.r. 525*l.*, y.r. 1,110*l.* 25,000

July 27.—By H. R. FARNAN.

Forest Gate.—9, Victoria-rd., f., y.r., 30*l.* 350

By J. E. FISHER.

Tooting.—Aldis-st., a freehold plot of land .. 100

By FULLER, HORSEY, SONS, & CASSELL.

Hoxton.—New North-rd., "Times Wharf," area 20,500 ft., u.t. 14½ yrs., g.r. 280*l.*, p. 610

By HIBBARD & WHITTINGHAM.

Tottenham Court-road.—54, Goodge-st. (shop and flats), u.t. 76 yrs., g.r. 70*l.*, y.r. 293*l.* 16*s.* 2,500

By HENRY LANGSTON & CO.

Peckham.—122 and 124, Lower Park-rd., u.t. 63 yrs., g.r. 8*l.*, w.r. 62*l.* 8*s.* 300

By ROBINS, GORE, & MERCER.

Belgravia.—7, Cliveden-pl., u.t. 16½ yrs., g.r. 10*l.*, y.r. 150*l.* £1,050
Hyde Park.—133, Westbourne-ter., u.t. 33 yrs., g.r. 50*l.*, y.r. 110*l.* 750
Maida Hill.—123, Maida-vale, u.t. 29 yrs., g.r. 10*l.* 10*s.*, y.r. 110*l.* 920
Belgravia.—44, Chester-sq., and 43, Ebury-mews, u.t. 19½ yrs., g.r. 10*l.* 10*s.*, y.r. 170*l.* 2,175
Mayfair.—11, Upper Brook-st. and 11, Lees-mews, u.t. 24½ yrs., g.r. 100*l.*, y.r. 200*l.* 1,400
Bloomsbury.—60 and 60A, High-st. and 28, Denmark-st. (s.), area 967 ft., f., y.r. 284*l.* 2*s.* 3,000
22, Denmark-pl. (Smithy), area 438 ft., f., y.r. 28*l.* 550

By R. TIDEY & SON.

Stoke Newington.—12, Sandbrook-rd., u.t. 60 yrs., g.r. 5*l.*, y.r. 32*l.* 330
Deptford.—24 and 26, Dorking-rd., u.t. 44 yrs., g.r. 4*l.* 12*s.*, w.r. 52*l.* 470

By F. VARLEY & SON.

Finsbury Park.—30 and 32, Tollington-pl., u.t. 75 yrs., g.r. 19*l.* 19*s.*, y.r. 91*l.* 660
8, Ambler-rd., u.t. 16 yrs., g.r. 6*l.*, e.r. 40*l.* 450

By WALTON & LEE.

Westoning, Beds.—"Westoning Manor Estate," 102 a. 1 r. 8 p., f. 6,950

By BRUTON, KNOWLES, & CO. (at Gloucester).

Cranham, Glos.—The Cranham Brewery, with seven tied houses, f. and c. 13,800

By GEORGE HONE (at Tewkesbury).

Deerhurst, Glos.—"The Hoo" and 20a. 1r. 26p., f., p. 1,300
Tewkesbury, Glos.—"Oldbury Field," 5a. 0r. 20 p., f. 340
61 and 62, Church-st., f. 1,050
St. Mary's-la., freehold house with two cottages, buildings, yards, etc., y.r. 35*l.* 600

July 28.—By A. ALDRIDGE & CO.

Bow.—104 to 110 (even) Bow-rd. (s.), y.r. 320*l.*; also i.g.r. 10*l.*, g.r. 65 yrs., g.r. 56*l.* 3,390

By PERCY H. CLARKE.

Clerkenwell.—47 and 48, Amwell-st., u.t. 8 yrs., g.r. 16*l.*, y.r. 56*l.* 110
Chelsea.—3, Netherton-gr., u.t. 22 yrs., g.r. 5*l.*, e.r. 60*l.* 360

By DEBENHAM, TEWSON, & CO.

City of London.—59, Leadenhall-st. (Wilkinson's Boiled Beef House), beneficial lease for 18½ yrs., y.r., 250*l.*, with goodwill 1,000
Stockwell.—Burnley-rd., f.g. rents 19*l.* 10*s.*, reversion in 58 yrs. 500

By ELLIS, COPP, & CO.

Putney.—2, Erpingham-rd., u.t. 70 yrs., g.r. 6*l.*, y.r. 34*l.* 340

By FAREBROTHER, ELLIS, & CO.

Wimbledon.—South Park-rd., a freehold building plot 300
Broadway Mews, freehold stabling, y.r. 48*l.* 600

By GARRETT, WHITE, & POLAND.

Mayfair.—20, Grosvenor-st., and 20, Brooks-mews, u.t. 24½ yrs., g.r. 100*l.*, y.r. 425*l.* .. 4,150
Regent Street.—No. 94, also 54, Warwick-st. (s.), profit rental of 400*l.* for 14½ yrs. 2,000
Paddington.—15, Bishop's-rd. (s.), u.t. 34 yrs., g.r. 25*l.*, y.r. 100*l.* 750
10, James-st., and 10, Shelden-st. (s.), u.t. 34 yrs., g.r. 35*l.*, y.r. 152*l.* 1,370
12, James-st. (s.), u.t. 34 yrs., g.r. 25*l.*, y.r. 81*l.* 610

By GLASIER & SONS.

Walworth.—300, Walworth-rd. (s.), u.t. 28 yrs., g.r. 18*l.* 5*s.*, y.r. 80*l.* 800

By MARK LIELL & SON.

Victoria Park.—127, Bishop's-rd, u.t. 49½ yrs., g.r 6*l.* 10*s.*, y.r., 38*l.* 370
Canning Town.—47 to 55 (odd), Bidder-st., and 36 and 38, Junction-st., u.t. 71 yrs., g.r. 30*l.*, w.r. 149*l.* 10*s.* 250
Plaistow.—1 and 3, New Barn-st., area 5,000 ft., f., y.r. 72*l.* 960

By C. C. & T. MOORE.

Limehouse.—7 to 10, Kirk's-pl., u.t. 21 yrs., g.r. 15*l.*, w r. 98*l.* 16*s.* 330
Mile End.—13, Edward-st., u.t. 26 yrs., g.r. 3*l.* 5*s.*, w.r. 39*l.* 240
Poplar.—47, Kerby-st., u.t. 54 yrs., g.r. 3*l.*, w.r. 27*l.* 6*s.* 185
Limehouse.—38, Conder-st. (s.), c., w.r. 35*l.* 2*s.* 280
Stratford.—14, Union-st., f., w.r. 15*l.* 12*s.* .. 200
10, Maryland-st., f., w.r. 26*l.* 300
94, Leytonstone-rd., f., y.r. 24*l.* 560
43, Forest-la., f., y.r. 26*l.* 490
Forest Gate.—57 and 59, Woodford-rd., u.t. 72 yrs., g.r. 10*l.*, y.r. 65*l.* 370

By NEWBON, EDWARDS, & SHEPHARD.

Bloomsbury.—10, Silver-st. (s.), u.t. 26 yrs., g.r. 7*l.*, y.r. 60*l.* 440
Marylebone.—22, Devonshire-st. (s.), u.t. 10½ yrs., g.r. 5*l.* 5*s.*, y.r. 40*l.* 180
Ealing.—48 and 50, Northfield-rd., u.t. 71 yrs., g.r. 3*l.* 12*s.*, w.r. 41*l.* 12*s.* 250
Caledonian-rd.—No. 539, u.t. 49½ yrs., g.r. 1*l.*, e.r. 55*l.* 670
Holloway.—46, Durham-rd. (s.), f., y.r. 50*l.* .. 690
45, Durham-rd., f., y.r. 30*l.* 400
Durham-rd., f.g.r. 5*l.*, reversion in 42 yrs. .. 135
Stoke Newington.—Allen-rd., f.g. rents 15*l.*, reversion in 55 yrs. 420
Kentish Town.—7 and 9, Ashdown-st., u.t. 60 yrs., g.r. 14*l.*, w.r. 115*l.* 14*s.* 630
61, Warden-rd., u.t. 55 yrs., g.r. 7*l.*, w.r. 59*l.* 16*s.* 380

By SIM & RANDALL.

Ilford.—52, Eastwood-rd., u.t. 994 yrs., g.r. 10*l.* 14*s.*, e.r. 45*l.* 340

By SMALLPEICE, ALLEN, & CO.

Stoke Newington.—123, Stoke Newington-rd. ("Palmer's Stores"), u.t. 60½ yrs., g.r. 10*l.*, y.r. 50*l.* 680

By WOODS & SNELLING (at Maidstone).

Yalding, Kent.—"Hook Farm," 20 a. 3 r. 0 p., f. 750
Goudhurst, Kent.—"Harper's Farm," 59 a. 0 r. 20 p., f. 1,700

By STIMSON & SONS.

Enfield.—Park-ter., f.g. rents 52*l.* 10*s.*, reversion in 83 yrs. £1,300
Bromley-by-Bow. — Devon's-rd., f.g. rents 12*l.* 12*s.*, reversion in 58 yrs. 305
294 and 296, Devon's-rd., u.t. 58 yrs., g.r. 8*l.*, y.r. 80*l.* 690
288, Devon's-rd. (s.), f., e.r. 35*l.* 255
304, Devon's-rd. (s.), u.t. 96½ yrs., g.r. 6*l.*, y.r. 46*l.* 16*s.* 340
39, Tidey-st., f., w.r. 36*l.* 8*s.* 330
14 and 15, Weston-st., f., w.r. 66*l.* 6*s.* 500
35, Glaucus-st., f., w.r. 28*l.* 12*s.* 250
Bow.—62, Campbell-rd., u.t. 58 yrs., g.r. 5*l.*, w.r. 46*l.* 16*s.* 355
4 to 12 (even), Swaton-st., u.t. 58 yrs., g.r. 18*l.* 15*s.*, w.r. 184*l.* 12*s.* 1,235
46 and 48, Rounton-rd., u.t. 58 yrs., g.r. 7*l.* 10*s.*, y.r. 78*l.* 550
Canning-town.—330, Barking-rd. (s.), f., y.r. 50*l.* 620
Notting Hill.—4, Faraday-rd., u.t. 60 yrs., g.r. 7*l.* 10*s.*, w.r. 66*l.* 6*s.* 425
Kensington.—73, Lower Kennington-la., c., y.r. 44*l.* 330
Enfield.—1 to 5, Maude-villas, u.t. 75½ yrs., g.r 19*l.* 19*s.*, y.r. 97*l.* 12*s.*; also f.g.r. 19*l.* 19*s.*, reversion in 75½ yrs. 800
South Lambeth.—43 and 45, Heyford-av., u.t. 83 yrs., g.r. 17*l.*, y.r. 119*l.* 12*s.* 795

By J. A. & W. THARP.

Bethnal-green.—11, Winchester-st., f., w.r. 32*l.* 10*s.* 215
Leyton.—61, Sophia-rd., f., w.r. 22*l.* 2*s.* 165
14, Carlisle-rd., f., w.r. 19*l.* 10*s.* 150
Leytonstone.—59, Lancaster-rd., f., w.r. 35*l.* 2*s.* 345
52, Cowley-rd., and ½ of an acre, f., p. 900
Stoke Newington.—89, Mildmay-gr., u.t. 45 yrs., g.r. 6*l.* 10*s.*, y.r. 40*l.* 380
Victoria Park.—2 to 9, Windsor-rd., u.t. 61½ yrs., g.r. 33*l.* 10*s.*, w.r. 263*l.* 18*s.* 700
Cubitt Town.—17 to 20, Marshfield-st., u.t. 36½ yrs., g.r. 18*l.*, w.r. 102*l.* 14*s.* 410

July 29.—By C. H. BROWN.

Pimlico.—14, Chichester-st., u.t. 29 yrs., g.r. 8*l.*, y.r. 60*l.* 385

By FERDINANDO & CO.

Kensington.—213, Kennington-rd., u.t. 29½ yrs., g.r. 8*l.*, y.r. 37*l.* 250

By HAMPTON & SONS.

Surbiton.—2, Parklands, f., y.r. 75*l.* 820

By NOKES & NOKES.

Hammersmith.—1, Masbro'-rd. (s.), u.t. 59 yrs., g.r. 5*l.*, y.r. 50*l.* 600

By WHITE, BERRY, & TAYLOR.

Leyton.—Francis-rd., f.g.r. 14*l.* 5*s.*, reversion in 99 yrs. 345
Salisbury-rd., f.g.r. 18*l.*, reversion in 89 yrs. 430
Walthamstow.—Arkley-rd., f.g.r. 24*l.*, reversion in 81 yrs. 525
Greenwich.—Norman-st., f.g. rents 24*l.* 10*s.*, reversion in 38 and 39 yrs. 630
Claremont-pl., f.g.r. 7*l.*, reversion in 39 yrs. 175

By WOOD & LOACH.

Edmonton.—8, The Parade (s.), f., e.r. 35*l.* 370
52 to 68 (even), Barbot-st., and 16, 17, and 18, Rosebery-rd, u.t. 71 yrs., g.r. 30*l.* w.r. 218*l.* 8*s.* 1,320

By WYBE ADAMS & GLOVER.

Camberwell.—Milbrook-road, l.g. rents 72*l.*, u.t. 18½ yrs., g.r. 4*l.* 5*s.* 705
Peckham. — Gibbon-rd., The "Alexandra Hotel," l.g.r. 100*l.*, u.t. 59 yrs., g.r. 47*l.* 10*s.* 810
Hoxton.—1, Shepperton-rd. (s.), u.t. 28 yrs., g.r. 8*l.*, y.r. 56*l.* 480
Bethnal Green.—Palm-st., the "Palm Tree," p.h., l.g.r. 100*l.*, u.t. 27 yrs., g.r. 23*l.* 13*s.* 850
Deptford.—Deptford Lower-rd., l.g.r. 60*l.*, u.t. 44 yrs., g.r. 8*l.* 5*s.* 700
Camden Town. — Park-st., the "Dublin Castle" p.h., l.g.r. 120*l.*, u.t. 12½ yrs., g.r. 20*l.* 810
Camberwell. — Commercial-rd, "Crown and Sceptre," p.h., l.g.r., 75*l.*, u.t. 22 yrs., g.r. 6*l.* 900
Hammersmith. — York-rd., "The Princess Alexandra," p.h., l.g.r. 70*l.*, u.t. 54 yrs., g.r. 12*l.* 12*s.* 900
Peckham.—Sandison-st., etc., l.g.r. 80*l.*, u.t. 43 yrs., g.r. 18*l.* 1,005
St. Pancras.—Pembroke-st., l.g.r. 31*l.* 10*s.*, u.t. 47½ yrs., g.r. 3*l.* 460
Brompton.—Pelham-st., the "Pelham Arms," p.h., l.g.r. 120*l.*, u.t. 8½ yrs., g.r. 20*l.* 10*s.* 550
Norwood.—Portland-rd., l.g.r. 80*l.*, u.t. 45 yrs., g.r. 12*l.*, with reversion 1,270
Wandsworth.—Wyvill-road, "The Builder's Arms," p.h., l.g.r., 84*l.*, u.t. 28 yrs., g.r. 20*l.* 780
Marylebone.—North-st., l.g.r. 45*l.*, u.t. 17½ yrs., g.r. nil 485
Hackney.—Kay-st., etc., l.g.r. 55*l.*, u.t. 12½ yrs., g.r. 15*l.* 300

By BISLEY & SONS.

Peckham.—19, York-gr., u.t. 73 yrs., g.r. 5*l.* 5*s.*, y.r. 40*l.* 390
Ledbury-st., l.g. rents 96*l.*, u.t. 57 yrs., g.r. 60*l.* 540
Garnies-st., l.g.r. 25*l.*, u.t. 59 yrs., g.r. 10*l.* 230
Dulwich.—71 and 73, Glengarry-rd., u.t. 75 yrs. g.r. 12*l.* 12*s.*, y.r. 60*l.* 575
Herne Hill.—2 to 26 (even), Hurst-st., u.t. 42 yrs., g.r. 67*l.* 5*s.*, w.r. 591*l.* 10*s.* 3,200
Bermondsey.—284 and 286, Rolls-rd., u.t. 36 yrs., g.r. 12*l.*, w.r. 78*l.* 450
Rotherhithe.—Reed-st., l.g.r. 19*l.*, u.t. 47½ yrs., g.r. 10*l.* 120

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; s.r. for quarterly rental; w.r. for weekly rental; u.t. for unexpired term; y.r. for yearly rental; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gns. for gardens; yd. for yard; gr. for grove; h.b. for beer-house; p.h. for public-house; o. for offices; s. for shops; ct. for court.

MEETINGS.

MONDAY, AUGUST 8.

British Archæological Association.—Annual Congress opens at Bath.

Institute of Sanitary Engineers, Ltd.—Organising Committee at 3 o'clock. Examination and Literary Committee at 5 o'clock. Council Meeting at 7 o'clock.

TO CORRESPONDENTS.

S. F. H. (Amount should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, manuscripts, or other documents sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 16 0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1 13 0	" " "
Facing Stocks ...	2 12 0	" " "
Shippers	2 10 0	" " "
Flettons	1 10 0	" at railway depôt.
Red Wire Cuts ...	1 13 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire ...	4 4 0	" " "
Do. Bullnose	4 10 0	" " "
Best Stourbridge Fire Bricks.....	4 8 0	" " "

GLAZED BRICKS.

Best White and Ivory Glazed Stretchers	13 0 0	" " "
Headers	12 0 0	" " "
Quoins, Bullnose, and Flats.....	17 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers...	16 0 0	" " "
One Side and two Ends	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamferred, Squints	20 0 0	" " "
Best Dipped Salt Glazed Stretchers, and Header	12 0 0	" " "
Quoins, Bullnose, and Flats.....	14 0 0	" " "
Double Stretchers	15 0 0	" " "
Double Headers...	14 0 0	" " "
One Side and two Ends	15 0 0	" " "
Two Sides and one End	15 0 0	" " "
Splays, Chamferred, Squints	14 0 0	" " "
Second Quality White and Dipped Salt Glazed	2 0 0	" less than best.

	s. d.	
Thames and Pit Sand.....	7 3	per yard, delivered.
Thames Ballast.....	6 0	" "
Best Portland Cement	30 0	per ton, "
Best Ground Blue Lias Lime	21 0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime.....12*s.* 0*d.* per yard, delivered.
Stourbridge Fireclay in sacks 27*s.* 6*d.* per ton at rly. dpt.

STONE.

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	" "
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf...	2 1	" "
White Basebed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf...	2 2½	" "

STONE (*continued*).

	s. d.	
Ancaster in blocks	1 11	per ft. cube, deld. rly. depôt.
Beer "	1 6	" "
Greenshill "	1 10	" "
Darley Dale in blocks...	2 4	" "
Red Corsehill "	2 5	" "
Closeburn Red Freestone	2 0	" "
Red Mansfield "	2 4	" "

YORK STONE—*Robin Hood Quality.*

Scappled random blocks	2 10	" "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per ft. super. "
6 in. rubbed two sides ditto, ditto	2 6	" "
3 in. sawn two sides slabs (random sizes)	0 11½	" "
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	" "
1½ in. to 2 in. ditto, ditto	0 6	" "

HARD YORK—

Scappled random blocks	3 0	per ft. cube, "
6 in. sawn two sides, landings to sizes (under 40 ft. super.)	2 8	per ft. super. "
6 in. rubbed two sides ditto	3 0	" "
3 in. sawn two sides (slabs random sizes)	1 2	" "
2 in. self-faced random flags	0 5	" "
Hopton Wood (Hard Bed) in blocks	2 3	per ft. cube, deld. rly. depôt.
" " " 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt.
" " " 3 in. do.	1 2½	" "

SLATES.

in. in.	£ s. d.	
20 × 10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20 × 12 " "	13 17 6	" "
20 × 10 first quality "	13 0 0	" "
20 × 12 " " "	13 15 0	" "
16 × 8 " " "	7 5 0	" "
20 × 10 best blue Portmadoc	12 12 6	" "
16 × 8 "	6 12 6	" "
20 × 10 best Eureka unfading green .	15 17 6	" "
20 × 12 " "	18 7 6	" "
18 × 10 " "	13 5 0	" "
16 × 8 " "	10 5 0	" "
20 × 10 permanent green	11 12 6	" "
18 × 10 " "	9 12 6	" "
16 × 8 " "	6 12 6	" "

TILES.

	s. d.	
Best plain red roofing tiles .	42 0	per 1000 at rly. depôt.
Hip and Valley tiles ...	3 7	per doz. " "
Best Brosely tiles.....	50 0	per 1000 " "
Do. Ornamental tiles	52 6	" " "
Hip and Valley tiles ...	4 0	per doz. " "
Best Ruabon red, brown, or brindled do. (Edwards)	57 6	per 1000 " "
Do. Ornamental do	60 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 0	" " "
Best Red or Mottled Stafford shire do. (Peakes).....	51 9	per 1000 " "
Do. Ornamental do.....	54 6	" " "
Hip tiles	4 1	per doz. " "
Valley tiles	3 8	" " "
Best "Rosemary" brand plain tiles.....	48 0	per 1000 " "
Best Ornamental tiles	50 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 8	" " "
Best "Hartshill" brand plain tiles, sand faced.	50 0	per 1 00 " "
Do. pressed.....	47 6	" " "
Do. Ornamental do	50 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 6	" " "

WOOD.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in	15 10 0	16 10 0
Deals: best 3 by 4.....	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 10 0	12 10 0
Battens: best 2½ by 6 and 3 by 6..	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	" " "
2 in. by 4 in. and 2 in. by 6 in....	9 0 0	9 10 0
2 in. by 4½ in. and 2 in. by 5 in....	8 10 0	9 10 0
Foreign Sawn Boards— 1 in. and 1½ in. by 7 in.	0 10 0	more than battens.
¾ in.	1 0 0	"
	At per load of 50 ft.	
Fir timber: best middling Dantzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.) ...	3 12 6	3 15 0
Small timber (6 in. to 8 in.)	3 0 0	3 10 0
Swedish balks	2 15 0	3 0 0
Pitch-pine timber (30 ft. average)	3 5 0	3 15 0

JOINERS' WOOD. At per standard.

White Sea: first yellow deals, 3 in. by 11 in	23 0 0	24 0 0
3 in. by 9 in.	21 0 0	22 10 0
Battens, 2½ in. and 3 in. by 7 in.	17 0 0	18 10 0
Second yellow deals, 3 in. by 11 in.....	18 10 0	20 0 0
" " 3 in. by 9 in.	17 10 0	19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	15 10 0	16 10 0
Battens, 2½ in. and 3 in. by 7 in.	11 10 0	12 10 0

WOOD (continued).	At per standard.					
JOINERS' WOOD (contd.)	£	s.	d.	£	s.	d.
Petersburg: first yellow deals, 3 in. by 11 in.	21	0	0	22	10	0
Do. 3 in. by 9 in.	18	0	0	19	10	0
Battens	13	10	0	15	0	0
Second yellow deals, 3 in. by 11 in.	16	0	0	17	0	0
Do. 3 in. by 9 in.	14	10	0	16	0	0
Battens	11	0	0	12	10	0
Third yellow deals, 3 in. by 11 in.	13	10	0	14	0	0
Do. 3 in. by 9 in.	13	0	0	14	0	0
Battens	10	0	0	11	0	0
White Sea and Petersburg:—						
First white deals, 3 in. by 11 in.	14	10	0	15	10	0
" " 3 in. by 9 in.	13	10	0	14	10	0
Battens	11	0	0	12	0	0
Second white deals, 3 in. by 11 in.	13	10	0	14	10	0
" " 3 in. by 9 in.	12	10	0	13	10	0
" " battens	9	10	0	10	10	0
Pitch-pine: deals	16	10	0	20	0	0
Under 2 in. thick extra	0	10	0	1	0	0
Yellow Pine—First, regular sizes	40	0	0	upwards.		
Oddments	28	0	0	"		
Seconds, regular sizes	30	0	0	"		
Yellow Pine oddments	25	0	0	"		
Kauri Pine—Planks, per ft. cube	0	3	6	0	5	0
Dantzig and Stettin Oak Logs—Large, per ft. cube	0	2	6	0	3	6
Small " "	0	2	3	0	2	6
Wainscot Oak Logs, per ft. cube.	0	5	0	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	8	0	0	9
¾ in. do. do.	0	0	7	—		
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0	0	9	0	1	0
Selected, Figury, per ft. sup. as inch	0	1	6	0	2	6
Dry Walnut, American, per ft. sup. as inch	0	0	10	0	1	0
Teak, per load	17	0	0	21	0	0
American Whitewood Planks, per ft. cube	0	4	0	—		
Prepared Flooring—	Per square.					
1 in. by 7 in. yellow, planed and shot	0	13	6	0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	1	0	0
1 in. by 7 in. white, planed and shot	0	12	0	0	14	6
1 in. by 7 in. white, planed and matched	0	12	6	0	15	0
1¼ in. by 7 in. white, planed and matched	0	15	0	0	16	6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0	11	0	0	13	6
1 in. by 7 in. do. do.	0	14	0	0	18	0
¾ in. by 7 in. white do. do.	0	10	0	0	11	6
1 in. by 7 in. do. do. do.	0	11	6	0	13	6

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton.					
	£	s.	d.	£	s.	d.
Rolled Steel Joists, ordinary sections	6	5	0 ...	7	5	0
Compound Girders, ordinary sections	8	2	6 ...	9	5	0
Angles, Tees and Channels, ordinary sections	7	17	6 ...	8	17	0
Flitch Plates	8	5	0 ...	8	15	0
Cast Iron Columns and Stanchions including ordinary patterns	7	2	6 ...	8	5	0

METALS.

	Per ton, in London.					
IRON—	£	s.	d.	£	s.	d.
Common Bars	7	5	0 ...	7	15	0
Staffordshire Crown Bars, good merchant quality	7	15	0 ...	8	5	0
Staffordshire "Marked Bars"	10	0	0 ...	—		
Mild Steel Bars	8	15	0 ...	9	5	0
Hoop Iron, basis price	9	5	0 ...	9	10	0
" " Galvanized	17	10	0 ...	—		
("And upwards, according to size and gauge.)						
Sheet Iron, Black—						
Ordinary sizes to 20 g.	9	15	0 ...	—		
" " 24 g.	10	15	0 ...	—		
" " 26 g.	12	5	0 ...	—		
Sheet Iron, Galvanised, flat, ordinary quality—						
Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g.	12	15	0 ...	—		
Ordinary sizes to 22 g. and 24 g.	13	5	0 ...	—		
" " 26 g.	14	5	0 ...	—		
Sheet Iron, Galvanised, flat, best quality—						
Ordinary sizes to 20 g.	16	0	0 ...	—		
" " 22 g. and 24 g.	16	10	0 ...	—		
" " 26 g.	18	0	0 ...	—		
Galvanised Corrugated Sheets—						
Ordinary sizes 6 ft. to 8 ft. 20 g.	12	10	0 ...	—		
" " 22 g. and 24 g.	13	0	0 ...	—		
" " 26 g.	13	15	0 ...	—		
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11	15	0 ...	—		
Best Soft Steel Sheets, 22 g. & 24 g.	12	15	0 ...	—		
" " 26 g.	14	0	0 ...	—		
Cut nails, 3 in. to 6 in.	9	0	0 ...	9	10	0
(Under 3 in., usual trade extras.)						

LEAD, &c.

	Per ton, in London.					
	£	s.	d.	£	s.	d.
LEAD—Sheet, English, 3lb. and up	14	7	6 ...	—		
Pipe in coils	14	17	6 ...	—		
Soil pipe	17	7	6 ...	—		
Compo pipe	17	7	6 ...	—		
ZINC—Sheet—						
Vieille Montagne ton	27	0	0 ...	—		
Silesian	26	15	0 ...	—		
COPPER—						
Strong Sheet per lb.	0	0	10 ...	—		
Thin " "	0	0	11 ...	—		
Copper nails "	0	0	10 ...	—		
BRASS—						
Strong Sheet "	0	0	9½ ...	—		
Thin " "	0	0	10 ...	—		
TIN—English Ingots "	0	1	3½ ...	—		
SOLDER—Plumbers' "	0	0	6½ ...	—		
Tinmen's "	0	0	8 ...	—		
Blowpipe "	0	0	9 ...	—		

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d.	per ft. delivered.
" fourths	1¾d.	" "
21 oz. thirds	3¼d.	" "
" fourths	2¼d.	" "
26 oz. thirds	4d.	" "
" fourths	3¼d.	" "
32 oz. thirds	5d.	" "
" fourths	4¼d.	" "
Fluted Sheet, 15 oz.	3d.	" "
" 21 oz.	4d.	" "
¼ Hartley's Rolled Plate	1¾d.	" "
⅜ " " " "	1¾d.	" "
½ " " " "	2¾d.	" "

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes	per gallon	0	1	7
" " " in barrels	"	0	1	8
" " " in drums	"	0	1	10
Boiled " " in pipes	"	0	1	9
" " " in barrels	"	0	1	10
" " " in drums	"	0	2	0
Turpentine, in barrels	"	0	3	6
" in drums	"	0	3	8
Genuine Ground English White Lead	per ton	18	15	0
Red Lead, Dry	"	18	10	0
Best Linseed Oil Putty	per cwt.	0	6	6
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.

	Per gallon.		
	£	s.	d.
Fine Pale Oak Varnish	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Fine Extra Hard Church Oak	0	10	0
Superfine Hard-drying Oak, for seats of Churches	0	14	0
Fine Elastic Carriage	0	12	6
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	16	0
Finest Pale Durable Copal	0	18	0
Extra Pale French Oil	1	1	0
Eggshell Flatting Varnish	0	18	0
White Copal Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	6
Berlin Black	0	16	0
Knotting	0	10	0
French and Brush Polish	0	10	0

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 28s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 30s. per annum. Remittances (payable to J. MORGAN) should be addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*

CWMSYFIOG.—For erecting a new infants' school, etc., at Cwmsyfiog, near New Tredegar, for the Bedwellty School Board. Messrs. James & Morgan, architects, Charles-street-chambers, Cardiff:—

J. Lewis	£7,534 16 0	W. Williams & Sons	£6,360 0 0
H. Rowlands	6,989 18 3	Lattey & Co., Ltd., Cardiff*	6,283 0 0
J. E. Evans	6,650 0 0	E. Gronow	6,254 0 0
D. Davies	6,470 0 0		
D. H. Davies	6,447 0 0		

DOWNPATRICK.—For extension of county courthouse, for the Down County Council. Mr. James Heron, County Surveyor:—

J. & I. Stockdale	£2,400	J. A. Gordon, Newtownards*	£1,995
P. McAleenan	2,320		
P. Ritchie	2,220		

DUNDALK.—For additions and alterations to Newtowndarver House and out-offices, for Mrs. Robinson. Mr. W. S. Barber, C.E., architect, Francis-street, Dundalk. Quantities by the architect:—

J. P. Gaskin	£1,309 0	N. Cullingham, Stabannon*	£1,253 6
T. McDonald	1,288 0		
J. Kelly	1,277 0		

GUILDFORD.—For carrying out certain works at the Charlotteville Schools, for the Education Committee. Mr. E. L. Lunn, architect and surveyor, 36, High-street, Guildford:—

Alterations.

Addis & Co.	£449	Tribe & Robinson	£357
Higlett & Hammond	403	R. Smith, Bury Fields, Guildford*	345
A. & F. Gammon	395		
S. Ellis	383		

Tar Paving.

Cunningham, Forbes, & Co.	£60 0	Holman & Co., South Bermondsey*	£48 10

Whitening and Colouring.

Higlett & Hammond	£171 0 0	Addis & Co.	£116 14 0
A. & F. Gammon	164 0 0	R. Smith	111 0 0
S. Ellis	157 0 0	J. Foster	98 11 0
A. Franks	118 0 0	Edmead & Sons	94 17 6
Tribe & Robinson	118 0 0	G. W. Blizzard, 17, Chertsey-street, Guildford*	73 15 0

HANWELL.—For the erection of a new school at Oaklands-road, Hanwell, for the Middlesex County Council:—

F. G. Minter, Westminster* £18,250

HANWELL.—For alterations to St. Mark's School, Hanwell, for the Middlesex County Council:—

A. & B. Hanson, Southall* £3,574

HAYLE (Cornwall).—For erecting a bungalow on Hayle Towans, for Mr. G. Spray, Cardiff. Mr. Humphrey T. Broad, architect, Hayle, Cornwall:—

W. J. Roach	£933 11 7	Mitchell & Dunn, Camborne and Hayle*	£839 0 0
J. Beryman & Hoskin	872 4 0		
White & Thomas	870 0 0		

HUDDERSFIELD.—For erecting jam works in the beast market. Mr. Ben Stocks, architect, St. Peter's-street, Huddersfield:—

Mason: A. Schofield*	£559 19 2
Joiners: Hollingworth & Son*	152 14 10
Plumber: S. Hale*	137 10 0
Plasterer: W. E. Jowitt*	29 10 0
Slater: W. E. Jowitt*	69 9 6
Painters: W. H. Spivey & Son*	15 18 0
Ironfounders: H. Brook & Co.*	45 15 6
Concreter: J. Cooke*	67 19 7

[All of Huddersfield.]

KINGSWINFORD.—For erecting an engine-house, boiler-house, and pump-room at Ashwood Pumping Station, Kingswinford, near Dudley, for South Staffordshire Waterworks Co. Mr. H. Ashton Hill, engineer, Paradise-street, Birmingham:—

W. Willett & Sons	£8,900 0 0	D. Roberts	£6,290 0 0
G. E. Jackson	7,040 5 3	T. Lowe & Sons	6,265 0 0
T. J. Mason	6,998 0 0	Gowing & Ingram	6,252 0 0
H. Lovatt	6,799 5 0	J. Roberts & Sons	6,224 0 0
H. Gough & Son	6,750 0 0	Oakley & Coulson	6,219 0 0
W. Sapcote & Sons	6,598 0 0	H. Dorse	6,195 0 0
M. Round	6,500 0 0	C. A. Horton	6,095 0 0
J. Barnsley & Sons	6,488 0 0	F. Lindsay Jones	5,995 0 0
Collins & Godfrey	6,487 0 0	J. Dallow & Sons, Blackheath, Birmingham*	5,950 0 0
J. Bowen & Sons	6,379 0 0		
H. Willcock & Co.	6,336 0 0		

LONDON.—For alterations, repairs, and decorations at the Church of St. Mary Magdalene, Peckham. Mr. George A. Lansdown, architect, Regent-street, S.W.:—

Barrie Bros.	£1,926 0 0	H. & E. Lea	£1,315 10 0
W. Sayer & Sons	1,545 0 0	J. Marsland & Sons	1,257 0 0
W. O. Collingwood	1,328 11 1	T. G. Sharpington*	1,206 0 0

LONDON.—For alterations and repairs at 50 Portdown-road, W., for the Executors of the late John Robbins. Mr. George A. Lansdown, architect, Regent-street, S.W.:—

W. Read	£495	Spiers & Sons*	£194
Shire & Sons	405		

LONDON.—For Fulham Town Hall extension contract. Mr. Francis Wood, A.M.I.C.E., Borough Surveyor, architect:—

Pottar Bros.	£28,000 0 0	H. L. Holloway	£24,000 0 0
W. Gregar & Son	26,984 0 0	J. Chessum & Son	23,966 0 0
W. Willett	26,700 9 6	W. H. Larden & Son	23,953 0 0
Pethick Bros.	25,944 0 0	T. & E. Davey	23,769 0 0
Holliday & Greenwood.	25,777 0 0	Martin, Wells, & Co.	23,730 0 0
W. J. Renshaw	25,701 0 0	Foster & Dicksee	23,623 0 0
Hoeckley & Co.	25,080 0 0	B. E. Nightingale	23,205 0 0
J. E. Johnson & Son	24,995 0 0	Dearing & Son	23,197 0 0
Stimpson & Co.	24,900 0 0	Johnson & Co., Ltd.	22,930 0 0
Cropley Bros.	24,882 0 0	W. Wallis	22,913 4 6
Spencer, Santo, & Co., Ltd.	24,650 0 0	Wall & Co., Ltd.	22,870 0 0
W. Lawrence & Son	24,538 0 0	A. N. Coles	22,806 0 0
G. E. Wallis & Sons	24,443 0 0	H. Knight	22,591 0 0
Leslie & Co.	24,434 0 0	F. G. Minter*	22,172 0 0
H. Lovatt, Ltd.	24,400 0 0	J. Ferguson & Co.‡	16,500 0 0

‡ Withdrawn.

LONDON.—For paving the undermentioned streets with asphalte, for the Corporation:—

Carriageways (with Compressed Asphalte Laid in Blocks).

London Asphalte Co.*:—Bartholomew-close (from Butchers' Hall to "Coach and Horses" public-house), £276; Leadenhall-street (between Billiter-street and Gracechurch-street), £111 0s. 6d.

Footways (with Compressed Asphalte Laid in Powder).

London Asphalte Co.*:—Oat-lane, £18 15s.; Lilypot-lane, £15 12s. 6d.; Castle-court, £32 16s. 3d.; Ball-court, Cornhill, £33 15s.; Three Tuns-passage, Newgate-street, £45 6s. 3d.; Three Falcon-court, £15; Providence-place, £78 2s. 6d; Hutchison-avenue, £125; Seven Step-alley, £9 7s. 6d.

LONDON.—For re-paving with granite setts a portion of the carriageway of Lower Thames-street, E.C., for the Corporation:—

Mowlem & Co.* £918

LONDON.—For fixing a high-pressure incandescent lamp (3,000 c.-p.) on the island refuge in Mansion House-street, E.C., for the Corporation:—

Keith, Blackman, & Co.* £103 5

TENDERS.—*Continued on page 170.*

CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issue.)

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tenders, etc., supplied by	Tenders to be Delivered
Additions to Farmhouse at Greenhead, Clackmarras	.....	J. Wittet, Architect, Elgin	Aug. 6
Two Houses, Machen	.....	W. H. John & Sons, Machen	do.
Drainage Works, Fusehill Workhouse	Guardians	G. Armstrong, Architect, 24, Bank-street, Carlisle	Aug. 8
Church Hall, Cefn Coed	Rev. J. Davies	R. C. Jenkins, Architect, Cefn Coed	do.
120 Tons of Guernsey Granite Siftings	Herne Bay U.D.C.	F. W. Palmer, Surveyor, Council Offices, Herne Bay	do.
1,123 lineal ft. of Norway Granite Channel	do.	do.	do.
Entrance Lodge, Nuns Moor Recreation Ground	Newcastle-on-Tyne Town Moor Com.	City Architect, Town Hall, Newcastle-on-Tyne	do.
Paving, etc., Reservoir-street	Dewsbury Corporation	Borough Surveyor's Office, Town Hall, Dewsbury	do.
Paving, etc., Greenwood-street	do.	do.	do.
Lavatory and Sanitary Blocks to Workhouse	Guardians	T. Winn & Sons, Architects, 92, Albion-street, Leeds	do.
School, Cromwell-road, Westham, Weymouth	Weymouth Education Committee	Crickmay & Sons, Architects, 13, Victoria-st., Westminster, S.W.	do.
Enlarging Goods Shed, Old Milford Station	G.W. Railway Co.	Engineer at Neath Station	do.
Main and Branch Outfall, Sewers, and Road	Milngavie Town Council	Niven & Haddin, C.E., 131, West Regent-street, Glasgow	Aug. 9
Concrete Tanks, Filters, etc.	do.	do.	do.
Twenty-five Houses, Park Hill, Tredegar	Chamber of Trade Building Club	W. Beddoe Rees, A.R.I.B.A., 37, St. Mary-street, Cardiff	do.
New Lead Gutters, etc., Harberton Church, Totnes	.....	Mr. Barrons, Weir View, Totnes	do.
Engine Tyres	Secretary of State for India	Director-General of Stores, India Office, Whitehall	do.
Extension of Infirmary for Males, Union Workhouse	Kingstown Guardians	W. H. Hope, C.E., Seymour-road, Hampton Wick	do.
High, Low Pressure Piping for Two 750-kw. turbo genrs.	Manchester Electricity Committee	F. E. Hughes, Sec., Electricity Depart., Town Hall, Manchester	do.
Rails and Fish Plates	South Indian Railway Co.	H. W. Notman, 55, Gracechurch-street, E.C.	do.
Fish Bolts and Spikes	do.	do.	do.
Switches and Crossings	do.	do.	do.
Painting at Infirmary, Beckett-street, Leeds	Guardians	J. H. Ford, Poor Law Offices, South-parade, Leeds	do.
Repainting Finger-Posts and Milestones	Whiston R.D.C.	J. Knapman, Surveyor's Office, Whiston	Aug. 10
Pipe Sewer, Brougham-place and Melville-drive	Edinburgh Corporation	Burgh Engineer, City Chambers, Edinburgh	do.
Tenements, Jail-square and Saltmarket-street	Glasgow Corporation	City Engineer, 64, Cochrane-street, Glasgow	do.
Four Houses, Short-street, Carlisle	R. Black & Son	R. Black & Son, West Walls, Carlisle	Aug. 12
Two-cell Horsfall Destructor, Dodworth	Windsor Town Council	Borough Surveyor, Alma-road, Windsor	do.
Painting County Asylum, Prestwich, Manchester	Committee of Visitors	At the Asylum	do.
Electric Light Installation, Maryhill Library	do	J. R. Rhind, Architect, 67, Hope-street, Glasgow	do.
*New Council School at Bagshot	Surrey Education Committee	Jarvis & Richards, 36, Victoria-street, Westminster, S.W.	do.
Painting of Tower, etc., S. Mabyn Church	.....	W. T. Martyn Mear, Architect, Rock, Wadebridge	Aug. 13
Reconstruct. Invert, etc., Cornbow Bdge., Hales Owen	Worcestershire County Council	A. E. Brookes, Breedon Cross, King's Norton	do.
Church, S. Aidan, New Clecthorpes	.....	G. R. Boreham, Quantity Surveyor, 24, John-street, Sunderland	do.
Kiln at Hythe Maltings, Colchester	.....	J. W. Start, Architect, Colchester	do.
Sinking a Pit 560 yds., Tylorstown, Glam.	D. Davis & Sons, Ltd.	Colliery Office, Ferndale	do.
*Combined Drains, Porchester-square and Terrace	Paddington Borough Council	Borough Surveyor, Town Hall, Paddington, W.	do.
Four Cottages and Stable, Pontlottyn	W. A. Morgan	W. A. Morgan, Picton Hotel, Pontlottyn	Aug. 15
Cattle Pens and Railways, Cumberland Basin	Bristol Docks Committee	W. W. Squire, Engineer, Cumberland-road, Bristol	do.
Street Works, Melville-place	Halifax Highways Committee	J. Lord, C.E., Town Hall, Halifax	do.
Two 1,000 k.w. Turbo Alternators	Leeds Corporation	J. B. Hamilton, Standard-buildings, City-square, Leeds	do.
Classrooms, Offices, etc., Hive End School., Chatteris	Isle of Ely Education Committee	R. S. W. Perkins, County Surveyor, Ely	do.
Cast-Iron Pipes	Scunthorpe U.D.C.	A. M. Cobban, Engineer's Office, Scunthorpe, via Doncaster	do.
2,000 Tons 90 lb. Bull-head Rails	G.N. Railway Co., Ireland	T. Morrison, Sec., Amiens-street Terminus, Dublin	do.
800 Tons Cast-Iron Chairs	do.	do.	do.
Renewal of Bridges on Cleland and Midcalder Line	Caledonian Railway Co.	Engineer, 3, Germiston-street, Glasgow	do.
Renewal of Bridges on Greenock Line	do.	do.	do.
Renewal of Bridges on Wishaw Deviation Line	do.	do.	do.
Renewal of Bridges on Stonehouse Line	do.	do.	do.
Renewal of Bridges on Pollok and Govan Line	do.	do.	do.
Widening High-street, Cymmer	Rhondda U.D.C.	W. J. Jones, Engineer, Public Offices, Pentre, Rhondda	do.
Laying Sewer Pipes at Hafod	do.	do.	do.
Conversion of 140 Earth-Closets into Water-Closets	do.	do.	do.
Church, Manselton, Swansea	Rev. C. Chaloner-Lindsey	E. M. Bruce-Vaughan, Architect, Cardiff	do.
Hall and Classrooms, etc., Heolyfelin Baptist Chapel	The Committee	J. Llewellin Smith & Davies, Architects, Aberdare	do.
Alterations, etc., & Painting, Heolyfelin Baptist Chapel	do.	do.	do.
Stormwater Sewers, etc. (No. 2, Aston Cross Section)	Aston Borough Council	G. H. Jack, Borough Surveyor, Council House, Aston Manor	do.
Wood Block Flooring, Wibsey Schools	Bradford Education Committee	T. Garbutt, Education Office, Manor-row, Bradford	do.
Wood Block Flooring, Marshfield Schools	do.	do.	do.
Cast-Iron Kerbs, Stockton Heath Bridge & Abutments	Warrington Corporation	Preece & Cardew, Engineers, 8, Queen Anne's-gate, S.W.	Aug. 16
Two Light Lattice Girders	do.	do.	do.
Hydraulic Locking Gear	do.	do.	do.
Tramways	Muni. Council, George Town, Penang	do.	do.
Engine Foundations, etc., Dublin, Pigeon House Wks.	General Electric Co. Ltd.	R. Hammond, M.Inst.C.E., 64, Victoria-street, Westminster	do.
Alterations, etc., to Hay Workhouse	Guardians	E. G. Davies, Architect, 7, Bridge-street, Hereford	do.
Paving, Gravel, Granite, etc., etc.	Portsmouth Corporation	A. Hellard, Town Hall, Portsmouth	do.
Repairs to Dock Gates, Leven	Kirkcaldy District Committee	W. D. Sang & Lockhart, C.E., Kirkcaldy	do.
Hutchesontown District Library	Glasgow Corporation	J. R. Rhind, Architect, 67, Hope-street, Glasgow	do.
400 lineal yds. of 18-in. Pipe Sewers, etc., Willington	Tynemouth R.D.C.	A. S. Dunning, 21, Ellison-place, Newcastle-on-Tyne	Aug. 17
Technical College Furnishings, Barking-rd., E. Ham.	East Ham U.D.C.	H. A. Cheers, Architect, Twickenham	do.
*Painting, etc., at Norwood Schools	Lambeth Guardians	Guardians' Board Room & Offices, Brook-st., Kennington-road, S.E.	do.
*New Road, from Wellington-st. to Wrexham-rd., Slough	.....	Lee & Farr, 65 & 67, High-street, Slough	do.
*Enlargement of Bath Station Sorting Office	Commissioner of H.M. Works, etc.	Sorting Office, near Bath Station	Aug. 18
*New Coastgd. Bldgs., Essex Hill, Alderney, Chan. Isl.	Admiralty	Superintending Civil Engineer, H.M. Breakwater, Portland	Aug. 19
*Add. Coastguard Buildings at Whitelands, nr. Seaton	do.	do.	do.
*New Buildings, Royal Naval College, Osborne	Commissioners of H.M. Works, etc.	Clerk of Works Office, Royal Naval College, Osborne	do.
Church, Finea, Westmeath	Rev. H. Farrelly, P.P.	Hague & M'Namara, 50, Dawson-street, Dublin	Aug. 20
Iron Mains and Pipes, Craiova, Roumania	Town Administration	Bureau de l'aprovisionnement, Craiova	Aug. 22
Sluice Valves, Hydrants, etc., Craiova, Roumania	do.	do.	do.
Two Double-acting Pumps, Craiova, Roumania	do.	do.	do.
2,200 yds. of Pipe Sewers, etc.	Billericay R.D.C.	J. Simmons, M.Inst.C.E., Bank Chambers, Doncaster	do.
Small Pumping-station, etc.	do.	do.	do.
Limestone at Gasworks	Glasgow Corporation	A. Wilson, Engineer, 45, John-street, Glasgow	Aug. 23
*Sewerage Works at Eaton Bray	Eaton Bray R.D.C.	Elliott & Brown, Burton-buildings, Parliament-street, Nottingham	Aug. 25
*Drain. & Sanita. Wks., Fulbourne Asyl. nr. Cambridge	Visitors, Camb., etc., Lunatic Asyl.	A. P. MacAllister, 20, St. Andrew's-street, Cambridge	Aug. 26
Water Supply Works	Wareham Corporation	G. Chatterton, Engineer, 6, The Sanctuary, Westminster, S.W.	Aug. 29
*Additions, Cornwallis-rd. Wkhse., Upper Holloway, N.	Islington Guardians	W. Smith, Architect, 65, Chancery-lane, W.C.	Sept. 1
Steam Motor Cars	G.N. Railway. Co, Ireland	T. Morrison, Secretary, Amiens-street Terminus, Dublin	Sept. 5
*Repair and Maintenance of Vans, Carts, etc.	Wandsworth Borough Council	Council House, Wandsworth, S.W.	do.
*Block of Schools at Southbury-road, Ponders End	Enfield Education Committee	G. E. T. Laurence, 22, Buckingham-street, Adelphi, W.C.	Sept. 6
*Additns., Alma-rd. School (Girl's Dept.), Ponders End	do.	do.	do.
*Cast-Iron Lamp Columns, etc.	Hanwell U.D.C.	Urban District Council Offices, Hanwell, W.	Sept. 13
*Broken Granite	do.	do.	do.
Sinking a Well	.....	Johnstone Bros., Architects, etc., 39, Lowther-street, Carlisle	No date.
Pair of Semi-detached Villas, Stables, etc., Roundhay	.....	F. Mitchell, Architect, 9, Upper Fountaine-st., Albion-st., Leeds	do.
Reconstruction of Wakefield Cattle Market	.....	C. W. Richardson & Son, Architects, 62, Westgate, Wakefield	do.
Painting, etc., Club Premises, Royston, nr. Barnsley	Working Men's Club	The Secretary	do.
*Erec'n, Iron Buildings, Bordon Wesleyan Camp Home	.....	Gordon & Gunton, Finsbury House, Blomfield-street, E.C.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*Clerk of Works	Isle of Thanet R.D.C.	3*l.* 3s. per week	Aug. 11
*Assistant Engineer	Singapore Municipal Commissioners	360*l.* per annum	Aug. 16
*Modelling Master	City and County Borough of Belfast	160*l.* per annum	Aug. 22
*Fourth Officer of London Fire Brigade	London County Council	300*l.* per annum	Sept. 17
*Assistant in Public Works Department	Protectorate of Uganda	240*l.*, etc.	No date.

Those marked with an asterisk (*) are advertised in this Number. *Competitions*, —. *Contracts*, iv., vi. viii. x. *Public Appointments*, xix.

TENDERS.—*Continued from page 168.*

LONDON.—For constructing an underground convenience in Fleet-street, by Fetter-lane, for the Corporation :—

W. Shurmur & Sons, Ltd.	£2,097 0 0
Davis & Bennett	2,077 0 0
B. E. Nightingale	2,049 0 0
G. Jennings, Ltd., Lambeth Palace-road*	1,991 11 2

LUTON.—For painting and cleaning schools, for the Education Authority. Mr. A. J. L. Evans, Surveyor :—

Langley-street Schools (Painting, etc.).

W. Chamberlain	£125	H. Lacey & Co.	£81
T. Wood & Sons	85	W. Fowler, Luton*	50

Waller-street Schools (Painting, etc.).

H. Lacey & Co.	£117 0	W. Chamberlain, Luton*	£105 0
T. Wood & Sons	110 10		

Dunstable-road Schools (Tar Paving).

B. S. Jones	£319 1 8	J. Smart, West-minster*	£273 10 0
A. W. C. Hobman & Co.	296 0 0		

Surrey-street Schools (Tar Paving).

B. S. Jones	£227 10 0	J. Smart, West-minster*	£195 0 0
A. W. C. Hobman & Co.	211 0 0		

MALLING.—For erecting a porter's lodge at the Isolation Hospital, East Malling, for the Rural District Council. Mr. Chas. Souter, architect. Quantities by contractors :—

W. T. Burrows	£254 0 0	E. H. Pye	£198 17 10
G. Hodges & Son	247 0 0	Clark & Epps	190 0 0
W. H. Allchin	214 0 0	R. Langridge, Snodland*	180 0 0
J. A. Davison	210 0 0		

NAIRN.—For erecting a road bridge of two spans across the river Nairn at Howford, for the County Council. Mr. P. M'Farlane Cram, C.E., Albert-street, Nairn. Quantities by engineer :—

Steel Work and Asphalte Work.

Brandon Bridge Building Co., Ltd., Motherwell	£1,137 0 9

Mason Work.

J. Mackenzie, Nairn	1,203 16 6

NOTTINGHAM.—For alterations and additions to premises of the Midland Institute for Blind, Chaucer-street and Clarendon-street. Mr. H. Gill, architect, Cobden-chambers, Pelham-street, Nottingham :—

	Section I.	Section II.	Total.
Hutchinson & Son	£8,000 0	£2,770	£10,770 0
Dennett & Ingle	7,980 0	2,730	10,710 0
W. Woodsend	7,700 0	2,860	10,560 0
E. Hind	7,882 0	2,636	10,518 0
J. Wright	7,769 0	2,536	10,305 0
H. Vickers & Son	7,719 10	2,560	10,279 10
A. B. Clarke	7,783 0	2,468	10,251 0
F. Messom	7,621 0	2,379	10,000 0
T. Fish & Sons, Pilcher Gate, Nottingham*	7,479 0	2,500	9,979 0
W. Maule & Co.	7,572 0	2,300	9,872 0

SOUTHAMPTON.—For private street works in Rigby-road, for the Corporation. Mr. J. A. Crowther, Borough Engineer, Municipal Offices, Southampton :—

Douglas & Richards	£221 12 0
F. Osman, Southampton*	199 0 0

STRATFORD-ON-AVON.—For erecting new laboratory adjoining school, for the Governors of the King Edward VI. School. Mr. E. G. Holtom, architect, 58, Henley-street, Stratford-on-Avon :—

Ward & Co.	£669 18 10	G. Euston	£496 0 0
Fincher & Co.	600 0 0	Harris & Cox	494 0 0

STRATFORD-ON-AVON.—For erecting a residence, St. Gregory's-road, for Mr. A. Smith. Mr. E. G. Holtom, architect, 58, Henley-street, Stratford-on-Avon :—

Ward & Co.	£1,450	G. Euston	£1,269
Fincher & Co.	1,375	Cox & Harris, Stratford-upon-Avon†	1,220
E. T. Kennard	1,330		

THAME (Oxon).—For water supply works, for the Urban District Council. Messrs. J. Taylor, Sons, & Santo Crimp, engineers, 27, Great George-street, Westminster, S.W. :—

A. G. Osenton	£7,965 15 0	G. W. Darlington	£6,208 0 0
B. Cooke & Co.	7,593 7 0	C. Chamberlain	6,079 2 7
W. W. Howland	6,825 0 6	Rowell & Sons	6,071 5 10
D. T. Jackson	6,851 11 10	W. & V. Green & Co.	5,987 18 0
F. W. Trimm	6,755 0 0	Davies, Ball, & Co., Yeovil*	6,009 0 0
A. E. Nunn	6,750 0 0		
J. Jackson	6,502 11 9		
J. Riley	6,363 16 0		
J. H. Vickers	6,257 0 0		

TIDESWELL.—For 250 yds. of earthenware pipe sewer, etc, Manchester-road, for the Bakewell Rural District Council. Messrs. Swann & Brady, engineers, Town Hall, Chapel-en-le-Frith :—

F. Eyre	£234 18 6	Pegg & Bailey	£146 8 6
Holmes & Ulyett	166 3 6	W. Moore, High-street, Tideswell*	118 18 11
H. Charlesworth	162 12 6		
W. Barrick	151 2 9	W. R. Swindell	112 0 0

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